

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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MAY 1917 VOL. 23

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**FORESTS : ESTATES : TIMBERLANDS
PRESERVES : FARMS : CAMPS : ETC.**

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Superintendent of the Flathead Indian School, Dixon,
Montana, will be received until twelve o'clock noon,
Mountain time, Tuesday, September 11, 1917, for
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and allotted lands situated within Sections 4 and 5 T.
19 N., R. 19 W.; Sections 5, 6, 7, 8, 9, 10, 15, 16, 17,
18, 19, 20, 21, 22, 27, 28, 29, 32, 33, and 34 T. 20 N.,
R. 19 W.; Section 21, 22, 27, 32, 33, and 34, T. 21
N., R. 19 W.; Section 1 and Section 12 T. 20 N., R.
20 W. M. F. M. containing approximately 57,000,000
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and other species. Each bid must be submitted in
triplicate and be accompanied by a certified check on
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intendent of the Flathead Indian School, in the
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the date when the bid is accepted. No bid of less
than \$3 per thousand feet for Yellow Pine and \$1.25
per thousand feet for Douglas Fir, Larch and other
species will be accepted. The right to reject any and
all bids is reserved. Copies of regulations and other
information regarding the proposed sale including
specific description of the sale area may be obtained
from the Superintendent of the Flathead Indian
School, Dixon, Montana.

Washington, D. C., May 4, 1917. CATO SELLS,
Commissioner of Indian Affairs.

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Washington, D. C., March 24th, 1917. CATO SELLS,
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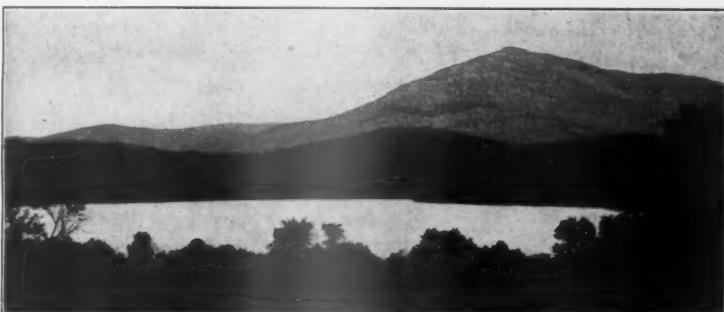


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WAR, LUMBER AND SHIPS

WITHIN the three weeks that followed the decree by Congress that a state of war exists with Germany, no industry has moved more quietly, sanely and orderly than the great lumber industry of the United States in its efforts to bring ultimate victory to America, her allies and democracy.

Hardly had the United States entered the war when Lloyd George delivered his famous address in which he declared: "The road to victory, the guaranty of victory, the absolute assurance of victory, has to be found in one word, ships, and a second word, ships, and a third word, ships."

Both the commissions to America, that of England headed by the Right Honorable Arthur James Balfour, and the French headed by Marshall Joffre and M. Viviani since their arrival in America, have stressed the need of ships even more than has Lloyd George.

This imperative need, President Wilson decided, must be met by the construction of wooden ships of about 3,000 tons each, with a speed of about 10 knots an hour in the peaceful lanes of the oceans and 12 knots in the areas where submarines ply.

Here is a big order to fill. Obviously big men had to be obtained for the task and big men have been obtained. These men are William Denman, of San Francisco, chairman of the United States Shipping Board; Raymond Stevens, of New Hampshire; John A. Donald, of New York; Captain James M. White, of Kansas City, Missouri; and Theodore Brent, of New Orleans. General George W. Goethals, builder of the Panama Canal, is to supervise the construction of the wooden merchant marine, and the big lumbermen of the country are aiding him in his gigantic task.

One of the first things Mr. Denman did when he got down to the business of executing plans for the fleet was to call in the lumbermen of America. He got immediately into touch with every man of consequence in the industry, and these men laid aside their private business and came forthwith to Washington to give the Government the advantage of their experience.

From the forests of the Pacific Coast and the Northwest will go to shipbuilding yards the best of the hardy Douglas fir, the South will supply its yellow pine, and Maine will contribute its hard pine, for conversion into bottoms to carry food, and, if necessary, men, to America's allies over the seas.

One of the big men whose advice is proving of inestimable value to the Government is Frederick A. Eustis of Boston. Mr. Eustis has volunteered his services to the Government during the duration of the war, and is re-

ceiving a salary of \$1 a year. He is an expert on the country's lumber supply, its transportation to the shipbuilding yards, and is supplying this vast technical knowledge for the benefit of the Government.

Captain John B. White, of Kansas City, Missouri, noted lumber conservationist, also gave up vast interests to let the Government have his time in this critical moment, and every member of the Shipping Board and the big lumbermen of the country have done likewise.

Mr. Eustis believes that wooden ships can be built at the rate of 200,000 tons a month, beginning October 1, without interfering with the construction of steel vessels. His idea is to build them of green wood as fast as it can be cut. Only the best wood will go to the shipbuilding yards and the cut-back will be used for the regular construction in which it has heretofore been applied.

Mr. Eustis also believes that within from fourteen to sixteen months America can have between 800 and 1,000 of these vessels. He has figured upon the highest degree of destruction by the submarine and is confident that the steel vessel supply of the Allies makes them safe for 10 months longer, after which time he is confident our output of wooden vessels can keep far ahead of the highest ship mortality rate the U-boats can inflict.

To give an idea of the supreme task ahead of Chairman Denman, Colonel Goethals and their associates, it is only necessary to remember that wooden shipbuilding is an art. The work must be done in shipbuilding yards at ports on either the east or west coasts or at Great Lake ports. The ships cannot be riveted together as steel ships are. There are known to be only 12,000 expert wooden shipbuilders in the United States and 150,000 are needed. Hence 130,000 men have to be mobilized and educated to do the work.

From one million to one-and-a-half million feet of lumber will be required for each vessel, yet surveys by the Government have shown that the amount of timber required for the ships will hardly make a dent in our great forests, only about 2 per cent of the total lumber supply being used.

The fixing of prices by agreement on the lumber to be sold to the Government has been one of the problems, among the first steps being an exchange of messages between the Southern Pine Association, and the committee on raw material of the National Defense Board. The lumbermen have agreed to throw all their efforts to the assistance of the Government, and to establish maximum and minimum prices for lumber to be used in such directions as barracks, shipbuilding, and other war necessities.

The work toward the building of wooden ships is progressing rapidly, and many keels are being laid, and many more are soon to be added to those now building. Oregon builders have already arranged to build forty wooden ships, and are preparing to turn out completed ships of 1,500 tons each in six months, and 3,000-ton vessels in eight months. Ten new shipbuilding plants may be located at Portland alone, with many others at Puget Sound and Gray's Harbor points. Similar contracts are being made on the Gulf Coast, and all along the Atlantic, with the Maine shipyards getting a new lease of life.

The big task is to get the men to build the ships. There will be seen in hundreds of American shipyards scenes not unlike those which once were common in Maine before the steel ship all but preëmpted the seas. That every shipbuilding yard in the United States will be running at full capacity, right up to the minute, when the German government is forced to its knees is fully realized.

The foresight of the men in the lumber industry in preparing for all eventualities months ago is proving of great aid to the shipping board. More than 900,000 men are engaged in the lumber trade, two and a third billion dollars are invested in it, and the most recent Government census showed that there are 49,738 lumber plants in the country. Since the great war's first guns were fired in August, 1914, lumbermen have been casting about to study the lumber markets of the world and to fill their orders.

Before the war Germany was the second greatest exporter of lumber in the world, being exceeded only by England and her colonies. German efficiency—the combination of manufacturing, shipping and banking interests—was responsible for this. When the Federal Reserve law was passed and national banks began taking on foreign branch banks the lumbermen saw their opportunity for expansion. Then came the war with the total elimination of Germany as a factor and the curtailment of English activity in foreign lumber sale.

So lumbermen of the United States began to get strongly in the market. In 1916 42,000,000,000 feet were cut, and then only one-third of the sawmill capacity of the country was used. With this fact in mind the shipping board knows that lumber for the wooden vessels can be supplied, the domestic trade cared for, and plenty left for export.

Coöperating with the Shipping Board to facilitate dealings between the Government and the producers is a committee of lumbermen composed of R. H. Downman, of New Orleans, president of the National Lumber Manufacturers' Association, chairman, Henry S. Graves, chief forester of the United States; D. O. Marion, South Carolina; E. T. Allen, Portland, Oregon; E. A. Selfridge, San Francisco; George B. Lewis, Holyoke, Massachusetts; W. M. Ritter, Welch, West Virginia; G. S. Long, Tacoma, Washington; Charles S. Keith, Kansas City; J. F. Gregory, Tacoma, Washington; C. H. Worcester, Chicago; W. H. Sullivan, Bogalusa, Louisiana; and W. R. Brown, Berlin, New Hampshire.

That the forests of the United States will not only furnish the lumber needed for the new ships but will also take care of the domestic demand and allow the sawmills of the country to accumulate a surplus for reconstruction

in Europe when the war is ended and without noticeably depleting these forests is the belief of this committee. In fact, it is known that there is an over-production of lumber to-day and its increased use is badly needed.

If the plans of the Shipping Board and the lumbermen are carried out there is little doubt that the object of the submarine campaign will be defeated. In the part the United States is to take in helping its allies to victory, nothing is of so much importance as helping to combat the European food-shortage, for food ranks ahead of men, money and munitions. Plenty of ships will not merely fend off the enemy, but will smite him down by assuring the transportation of the necessary supply of food.

Observers see in the efficient manner in which lumbermen have taken up the task to which the President of the United States has called them an impetus which will last long after peace is declared and as an outgrowth of this activity a large merchant marine to care for America's peace overseas trade and carrying out America's foreign trade ambitions.

But the big task right now is to supply ships. The Shipping Board has \$50,000,000 at its disposal immediately. It has the brains of the best lumbermen in America and these two agencies have set about determinedly to do the work assigned.

The standard ship, the Shipping Board announces, will be about 280 feet over all, with a 24-foot depth of hold and with two full decks, and will be capable of developing about 1,500 horsepower.

Bidders may propose to furnish completed ships or hulls only. Any firm desiring to submit proposals to build completed ships from their own plans may do so, but such plans will have to be approved by the Board's engineers.

Scores of shipbuilders have assured the Board that they will take contracts up to the limit of their capacity, and many of them at this writing have sent inquiries as to how soon specifications would be submitted and bids accepted. It is understood that some of the delay has been due to revisions made at the suggestion of the visiting war missions, particularly in regard to means of protecting the vessels from submarines. On that feature of the construction the naval consulting board also is giving advice.

To permit builders to make tentative plans, it was announced that the standard dimensions would be about as follows: Length between perpendiculars, 260 feet, over all, 280 feet; extreme beam, 46 feet; moulded depth, 26 feet; depth of hold, 24 feet; two full decks, forecastle, midship bridge house and poop and house on bridge for officers, power, steam; 1,500 horsepower, single or twin screws.

SPRING planting plans for the Pennsylvania State Forests, allotting 3,800,000 forest tree seedlings for this year's reforesting operations, have been approved by Commissioner of Forestry Robert S. Conklin. In addition to these trees for the State Forests, about 1,750,000 will be distributed free of charge to private individuals and corporations interested in reforesting. Almost 400,000 of these trees will be used by water companies in reforesting barren water-sheds upon which boroughs and cities depend for their water supply.

A MILLION AND MORE FOOD GARDENS

IN order to "Do Its Bit" in answer to the call for the mobilization of the nation's resources in this war period, the American Forestry Association has decided to coöperate with the National Emergency Food Garden Commission. The work to be done is to secure the planting of a million and more food gardens. If successful, and there is every indication that it will be, this work will be of tremendous service in relieving the food deficiency and solving the vitally important problem of feeding the nation and helping the nation's allies. The earnest assistance of every member of the Association is requested.—THE EDITOR.

HOME gardens, small, inexpensive but abundantly productive, today are flourishing in every city, town and village in the United States. There are thousands upon thousands of them. Men and women, old and young; boys and girls, debutantes, college students and workers, are toiling in the army of "universal service" to the nation. Hoes and rakes, spades and sprays, hold equal honor with rifle and sword. Corporate wealth, the greatest industries of the land, the most eminent of statesmen, scholars and scientists have enlisted in the army of food producers. States and cities, with their legislatures and city councils, governors and mayors aiding, have responded to the home garden call. In truth, the virgin soil of the nation is being put to the greatest test in all history.

For two months the nation-wide campaign for the planting of a million and more vegetable gardens in back yards

and vacant lots, conducted by the National Emergency Food Garden Commission, of which Charles Lathrop Pack, president of the American Forestry Association, is president and which is working in coöperation with the Conservation Department of the Association, has been in full swing. In that period war between the United States and Germany has been declared, the country's resources mobilized, industrial and commercial conditions revolutionized and, through presidential proclamation and governmental plea, the people have been urged to aid in the production of food that this country may escape a food crisis such as has afflicted the war-rent nations of Europe. And the people have responded. The one great menace—the lack of food—was early appreciated, and while the Government sought to stimulate farm production, the National Emergency Food Garden Commission directed its attention to



HOME TOMATOES

This is not a view of a nursery, but one of the home gardens in Danville, Illinois, where home gardening is encouraged by the Civic Federation. The response of public-spirited societies to the appeal of the National Emergency Food Garden Commission this year is putting such gardens as this in hundreds of American municipalities. This is a patch of exceptional tomatoes, with clean and sturdy stalks, trim tops and heavy with fruit, and staked and cultivated with the precision of an expert florist. Yet a school boy did it.

city production, the organization of the city millions into a vast agricultural army for the creation of a million food gardens, and the campaign has assumed proportions beyond even the most sanguine expectation of President Pack and his colleagues.

Since President Pack inaugurated the garden campaign the heads of all the great Government departments have sent out warnings of a national food crisis. President Wilson, in his appeal to the united nation to undertake measures of conservation, dwelt with much force on the imperative necessity of home gardening. He pointed out that "every man, woman and child must help," that the "railroads must suffer no obstruction of any kind," and that "everyone who creates or cultivates a garden helps solve the problem of feeding the nations."

President Pack and his co-workers, men of eminent standing in the world of science and letters, had expressed views similar to those enunciated by the President. The Commission realized the significance of the crisis hovering over the nation,—realized that no matter what the yield of the farms, the great transportation systems of the country would be powerless to transport the products, and it was distinctly this view which found expression in President Wilson's appeal to the nation in its greatest hour of need.

Secretary of Agriculture David Houston, when reports from his field agents and statisticians poured in on him, was convinced of the menace which threatened the country. Prognostications from every source pointed to the danger of a failure of crops and consequently the failure of a nation to feed its people.

This situation was foreseen by the Commission, hence the urging, the pleading, and the imploration that the people as a whole turn to individual agricultural pursuits; that they convert back yards and vacant lots into vegetable gardens, and that those products be raised which might take the place of meat and other food

PRESIDENT WILSON'S CALL TO SERVICE

WE must supply abundant food for ourselves and for our armies and our seamen, not only, but also for a large part of the nations with whom we have now made common cause, and in whose support and by whose sides we shall be fighting. * * *

"The world's food reserves are low. Not only during the present emergency, but for some time after peace shall have come, both our own people and a large proportion of the people of Europe must rely upon the harvests in America. * * *

"Let me suggest, also, that every one who creates or cultivates a garden helps, and helps greatly, to solve the problem of the feeding of the nations."

President Wilson's Proclamation, April 16, 1917.

products which the town and city dweller could not produce.

Such was the far vision of the Commission, and such was the beginning of a campaign which has spread from the Atlantic to the Pacific, and from Maine to the Gulf of Mexico. Governors of the biggest states in the Union, mayors of the most influential cities in the country (three hundred mayors assembled in

New York during the past month for the specific purpose of discussing and devising ways and means of mastering the food situation), great railroads of the East and the West, the mightiest corporations and industrial institutions of the country, the most eminent men and women of the social and official sets of thousands of communities, have all taken up the campaign of garden planting. The corporations and industrial and commercial institutions have procured land for their employes to till, have shoudered the expenses, that the food problem might be met. The big railroads induced their employes and those living along their lines to plant gardens and raise vegetables. Garden clubs, like a tented city rising during the night, were organized in every community, and so the movement spread, like a prairie fire until President Pack and his colleagues were forced to send into the various states field organizers, men who were experts in agricultural fineness, who might unite the various forces and inspire hearty and friendly coöperation that the food producing gardens might be of real benefit.

Nearly two thousand newspapers now are using daily planting lessons which are sent out from the Washington headquarters of the Commission. These lessons are supervised by experts from the Department of Agriculture, and tell how, when and what to plant, and what must be done to insure a full and healthy crop. In scores of cities and in hundreds of villages and towns gardens are flourishing, and already fresh vegetables are being gathered for the individual households. The tiny "farmlets"

are saving families



THE FOOD GARDEN HARVEST

No, this is not the first prize table in the exposition building at the county fair. It is just a neighbor-hood exhibit in Gloucester, Massachusetts, to show that the back yards are as fertile as the best farms. Any market gardener would be proud of such squashes, such pumpkins, turnips, tomatoes, and beets as these. To stimulate the growing of tons of such crops this year on the idle lands of cities, the National Emergency Food Garden Commission is urging civic organizations to conduct gardening competitions with prizes for the best crops grown.



MAKING CITY SOIL PERFORM

Not a large patch, but look how it grows. This boy took first prize in his class (children over 13 years of age) in the city-wide gardening contest conducted by Portland, Oregon. Productivity per square yard rather than gross produce or profits was the test. Rich soil and an exceptionally good location—on a well-drained southern slope—aided his success, but what he did can be approximated by the amateur gardener anywhere in the United States. In the distance can be seen another contestant on a bottom-land garden.

considerable money, and are proving of inestimable value to the Government. The good the movement thus far has accomplished cannot be measured adequately, for those who have embraced the opportunities offered by the Commission are perhaps enthusiastically over-indulgent in their praise, while others report they cannot conceive how the city millions could have met food conditions had not the garden idea been implanted in the hearts and brains of the people.

When the White House issued the garden plea the employes of the Executive Mansion immediately began plans for a garden. The Department of Justice gave permission to till a plot of ground opposite the White House, and President Pack sent to Nelson Webster, ex-

ecutive officer at the White House, \$100 worth of seeds. Mrs. Wilson, and members of social Washington, announced that only a three-course meal would in the future be served at formal functions. Garden clubs throughout the city of Washington began a systematic recruiting of boys and girls and men and women who were able to shoulder

a hoe and rake. Prizes have been offered for the most productive garden, and this phase also is being given much consideration in other cities. In Washington the campaign receives enthusiastic support, for it is realized, perhaps, that all governmental or nationwide campaigns of any character must at least have some connection with the capital of the nation.

But the work of the Com-

PLANT A GARDEN NOW

WAR has now made the planting of food gardens an imperative obligation upon every American citizen who has access to land, no matter how restricted its area. The man, woman, or child who allows any soil fertility or available labor to go to waste this year deserves the opprobrium that goes to the military slacker. We are perhaps approaching the time when we must adopt meatless days either voluntarily or by governmental fiat. Let us see to it that the food substitutes for meat are produced independently of the farms by a great host of home gardeners. Because it is late in the season, do not neglect to plant a garden for that reason; prolific gardens may be seeded until July. Plant a garden now and help win the war."—CHARLES LATHROP PACK.

mission has just begun, President Pack explains. William C. Redfield, Secretary of the Department of Commerce, says that the whole world is short of food supplies and that the future of civilization is dependent upon the crops of 1917. The war has taken from the fields of Europe the men needed to till the soil, and the women, though valiantly struggling behind the plow with that imperishable fire of



WHAT GIRLS CAN DO

In Europe the farming is now being done largely by women who have taken the place of men now at the front. In America this year girls are doing a great part toward realizing the ambition of the National Emergency Food Garden Commission—2,000,000 town and city gardens to insure sufficient food. These Pittsburgh children agree that girls make as good gardeners as their brothers or parents.

patriotism burning in their breasts, are unable to produce the food necessary for millions of hungry, desperate men who battle because they are told to battle.

The truth of the matter is that hunger stalks abroad, armies waver, and nations are trembling at their very foundations. For without food, revolution comes, and with revolution comes chaos and death and destruction to all alike. Without grain and meat from this country, and ammunition and arms, these latter the product of food-fed men, the nations of Europe must perish. The world knows this, and seeks not to discount the truth. There are periods in history when truth towers above all chicanery and petty artifices of diplomats. Such is the case today. Sophistry is giving way to humble truthfulness. The cry for food is "heard around the world."

The one great question which now confronts the people of this country is whether the Government can cope with a problem the magnitude of which never before has any nation contemplated. Food is the one dominating, all-powerful creative force which holds the destiny of the civilized world within its grasp. President Pack and his fellow members of the Commission feel that the farmer and rancher cannot alone supply food in sufficient quantity to feed this and the great nations of Europe, and that it is urgently necessary that the millions of individual city dwellers continue with undiminished vigor the home garden cultivation campaign. Unless this is done it is believed not only by President Pack and his colleagues but by the

Government itself that a shortage of food will result that will cause national, and, indeed, international suffering on the part of millions.

The Commission feels that every man and woman, boy and girl, should "do his bit." The schools soon will be closing for the summer period. Hundreds of thousands of youths and young girls who heretofore have indulged in baseball, tennis, golf and other forms of outdoor life, should cast aside such indulgences and rush to the aid of their country by mobilizing in the ranks of food-producing toilers. As Disraeli once said, "Old age is unknown to genius," and so the Commission repeats in its appeal to the men and women who are unable to aid their country other than through cultivation of gardens, "take up the hoe and rake and make America efficient." Old men, veterans of past conflicts, may well shoulder the spade, may well devise new methods of food production, for the time for "universal service" to mankind is at hand. Age is no limit, no barrier to achievement. Milton was 57 and



A NEIGHBORHOOD POTATO PATCH

The summer school vacation of three months was originally a rural institution, invented by farmers to give their sons time to help with the harvesting. When city schools fell heir to the vacation habit the problem arose of keeping the boys busy. The food garden largely solves the problem, and the boys like it. Potatoes take too much room for a small garden, so this street in a Massachusetts town has a community potato patch, cultivated largely by the children.

blind when he wrote "Paradise Lost," Dante was almost 70 when he composed his famous epic, Haydn produced his sublime "Creation" at 68, while Verdi was past 70 when he wrote the score of "Falstaff." Names of others might be multiplied indefinitely to prove conclusively that men and women only outlive their usefulness when they think their usefulness is past. The Commission points to these examples merely as an illustration for the guidance of those who because of age harbor the belief that they are incapacitated for "duty." For, says the Commission, "We are old only when we think ourselves old."

Back in 1902 Rudyard Kipling lashed his countrymen for their blindness in not being able to see that the future was preparing for them just the fate that did befall when the world-war broke out. In the poem which Kipling called "The Islanders," and which might almost as aptly have been written for the United States, he said; "Ye set your

eisure before their toil and your lusts above their need." Twenty millions of men have been withdrawn from production, and today three million women in England and more than four million in France have been drawn into employments hitherto monopolized by men. Why cannot the women in this country through the home garden perform the same patriotic service their sisters over the seas are offering up to their kindred sufferers?

Within the past month there gathered in this country for consultation leaders of the British, French and American peoples. Our allies at Yorktown, our enemies at Lexington are both in accord in the presence of a common enemy, and their common cause—the feeding of their embattling forces—perhaps was the most momentous topic of the deliberations. Food makes the sinews of war. Today the food yield is insufficient for the 100,000,000 who



SOME PRIZE GARDEN CABBAGES

This determined-looking young gardener is Clif Morton, who has the distinction of being the best farmer in a certain fertile county in the West. The camera caught Clif in the act of defying the world to raise better cabbages than his. His farm is an acre within the corporate limits of the town where he lives and goes to school. The National Emergency Food Garden Commission calls attention to the waste land on the outskirts of cities and towns which might be donated for the garden use of those who can cultivate larger spaces than the average back yard.

populate the land; yet, this country not only is expected to feed itself but to provide food in abundance for its allies in arms. "Can this be done?" the world asks.

The National Emergency Food Garden Commission, which means President Pack and every single member thereof, feels that we are in this war, and we must win it. Victory in this war means ample FOOD SUPPLIES. An army is just as strong as its food supply, and not one bit stronger. Men who have not plenty to eat, cannot march and cannot dig trenches or fight. Our allies are pleading for food, but we have little food to spare and can only produce a surplus above our own necessities by the swiftest organization of labor and definite mobilization of an agricultural army on the firing line of the farms.

Thus with the winter crop of wheat a disappointment, with the wheat crop of the great northwestern states, called the "granary of the world," which soon will be

reaped, and which already is predicted a failure by Government experts; with Russia, the second largest producer of wheat in the world, with twelve million men under arms, barely able to produce enough to feed her millions; with England, France and Italy looking to this country for succor; with Argentina, upon which the consuming world has



OVER THE FENCE FROM THE FACTORY

The toiler who has hard work making his pay keep the family in food need not worry if he has a back yard as deep as these in South Bethlehem, Pennsylvania. The fence acts as a windbreak from the north, giving early maturity to plants. All these back yards are cultivated as gardens this year. The National Emergency Food Garden Commission is trying to turn every back yard of this sort into a vegetable garden.

long relied, placing an embargo on wheat and flour to protect her own people against the high cost of living; with the financial resources of all Europe almost exhausted; with the man resources of Europe failing the great war in truth has brought the whole world, neutral nations as well as belligerent, to the very verge of economic exhaustion.

The concrete situation before the American people today is this: What will be the result when the Government begins transferring our millions of stalwart laborers from the wheat fields to the battlefields? The calling out of the National Guard means a loss of 30,000 men to the agricultural states alone. What will it mean when the needs of the regular army and navy are supplied and universal training takes away from the farms the youth of our land? Shall we impoverish ourselves by this action?

The answer to this problematical situation, in the opinion of the National Emergency Food Garden Commission, and coincided in by the most important Government officials, from the Secretary of Agriculture down to his clerk-statistician, is home gardening. It is recognized that the agricultural yield of the farms must of necessity be utilized by the Government for military and industrial purposes, that the city millions then must endeavor to cope with the situation through individual effort, through the transforming of back yards, vacant lots and all unutilized land into small productive vegetable gardens. In this man-

ner millions of dollars worth of food may be raised, the food yield of the nation thus becoming doubled, and the vast populations of the cities and towns and villages of the country will be self-supporting in a large measure. The movement already has gained much headway. Gardens by the thousands are flourishing, but gardens by the millions must spring up if the situation is to become permanently beneficial to a stricken world.

Aiding President Pack and Secretary Ridsdale in their efforts to assist the nation and the people to produce sufficient food are men of renown, including Luther Burbank, noted horticulturist, Dr. Charles W. Eliot, of Massachusetts, Dr.



A PRIZE CORN GROWER

The gardening ability of children is not overlooked in the campaign of the National Emergency Food Garden Commission for 2,000,000 home gardens this year. Children are the most numerous class who have much time to give to spade and hoe—but they are something more—they make splendid gardeners. Much of the lesson of better farming has been spread through many sections by the boys' corn clubs fostered by the Department of Agriculture. This is one of the prize winners—very proud of his crop.

Irving Fisher, of Yale, Fred H. Goff, of Ohio, John Hays Hammond, famous mining engineer, Fairfax Harrison, president of the Southern Railway, Hon. Myron T. Herrick, of Ohio, Dr. John Grier Hibben, president of Princeton, Emerson McMillin, of New York, Mrs. John Dickinson Sherman, of Chicago, Chairman, Conservation Department of the General Federation of Women's Clubs, A. W. Shaw, editor of *System*, of Chicago, Carl Vrooman, assistant Secretary of Agriculture, Capt. J. B. White, of the United States Shipping Board and a noted lumberman and conservationist, and Hon. James Wilson, former Secretary of Agriculture.

FORESTERS FOR NATIONAL DEFENSE

THE United States Forest Service is now bringing to bear every resource to assist the Council of National Defense and the military branches of the Government. "It is yet too early to give out details," stated Chief Forester Graves. "The Forest Service is, however, actively engaged along two broad lines—assisting the War Department through the use of our field forces in the protection of public property in regions remote from stations of the regular Army or the National Guard; and in coöperation with the Council of National Defense and its Advisory Committee on Lumber in the mobilization of forest supplies needed for the Army and Navy and the Shipping Board.

"Wood and wood products enter into the art of war to an astounding degree and to an extent hardly considered by the layman—for use in all manner of equipment, vehicles, airplanes and containers, for the manufacture of explosives, chemicals, surgical supplies and the like. Our problem is to marshal the great wood industries—lumber, hardwood specialties, naval stores, wood distillates, paper and pulp—to the end that the essential products of these organizations may be used to the highest advantage by the agencies charged with the prosecution of the war. In this work the Council of National Defense has secured active help and advice of prominent lumbermen who have in a very patriotic way volunteered their services."

The Executive Committee is composed of R. H. Downman of New Orleans, President of the National Lumber Manufacturers' Association; E. T. Allen of Portland, Oregon, Manager of the Western Forestry and Conservation Association; C. H. Worcester, of Chicago, President of the

Worcester Lumber Company; W. M. Ritter, of Welch, West Virginia, President of the Ritter Lumber Company; W. H. Sullivan, of Bogalusa, Louisiana, Manager, Great Southern Lumber Company and Henry S. Graves, Chief of the United States Forest Service. Other members of the Committees are D. O. Anderson, lumber manufacturer of Marion, South Carolina; E. A. Selfridge of San Francisco, President of the Redwood Manufacturers' Association; Geo. B. Lewis, lumber manufacturer of Holyoke, Massachusetts; G. S. Long of Tacoma, Washington, Manager, Weyerhaeuser Timber Company; W. E. Delaney, of Lexington, Kentucky, President, Kentucky Lumber Company; Charles S. Keith, of Kansas City, President of the Southern Pine Association; J. F. Gregory, of Tacoma, Washington, logger and lumber manufacturer, and W. R. Brown, of Berlin, New Hampshire, lumber and paper manufacturer.

Back of the census of the Government Forest Service men for war needs is a committee of professionals, members of the Society of American Foresters, named by the advisory council of that body for the purpose. Gifford Pinchot is chairman and associated with him are A. C. Ringland, Earle H. Clapp, and Herbert A. Smith of the Forest Service and Major George B. Ahern. E. T. Allen, forester for the Western Forestry and Conservation Association, is actively in charge of the gathering of information with regard to private and state foresters in his section.

Mobilization of the wood industries, as well as woods-men, may well prove a very important work for experts in woods and the characteristics which fit them for certain special uses. A good many things—rifle stocks, saddle trees, supply wagons, planks for pontoons, wooden aero-

plane parts, and numerous other wooden articles—will be needed by our armies. The specifications must be drawn up, the proper woods selected, the proper methods and machinery for working them up chosen, and the actual work done. All this must be done quickly, and, to insure satisfactory results, must be supervised by experts.

An example shows how important a seemingly insignificant point may be. Early in the war a British buyer placed a contract here for more than a million rifles. Specifications called for seasoned walnut stocks. Such walnut could not be found, so the contractor turned to green walnut and began to make the rifles. But the green wood cracked and checked to such an extent that there was a ruinous loss of sixty per cent of the wood. It became imperative to kiln-dry the green walnut. The Forest Service expert was called in and by control of kiln conditions overcame the trouble and reduced the loss from sixty to one per cent. This Government will need hundreds of thousands of rifles. It will not even be able to secure green walnut, except at prohibitive cost. And so the new specifications will call, in all probability, for birch and before the birch can be used without excess waste there will be another problem for the Forest Service expert to solve. Similar problems will arise in the selection of suitable substitutes for the white pine planks, now unobtainable but since time immemorial considered the only wood for pontoons, and in supplying the demand for suitable woods in the manufacture of aeroplane propellers, now that the woods considered essential are becoming scarce to the point of exhaustion.

With the double purpose of best serving the nation's needs in the war and at the same time furnishing adequate protection for the forests of the West, the Western Forestry and Conservation Association has conducted a "Defense Census of Trained Woodsman" among forestry men throughout that section. So simple and efficient has the plan proved itself that most of the state and private forest organizations throughout the country have taken it up. The result is that the nation has a splendid body of trained men ready to do the things which they can do best. Their abilities are not lost through random enlistment in military organizations not able to make the fullest use of them but are concentrated for special service, the demands of which they best meet.

With the dangers of the forest fire season directly ahead, it is also essential to know how many and what men will be available for forest protection work. Under certain circumstances forest organization men can be most useful where they are, not only in fire prevention but in guarding bridges, rail and telegraph lines and the like. In lumbering operations, particularly, are many foremen, engineers, woodsmen, and the like who are qualified for special service and who might be more needed in the woods than in a military organization.

The nature of their work places the majority of forest organization men ahead of the ordinary civilian in ability to care for themselves under adverse circumstances, to meet conditions with initiative, to handle men, horses, and supplies, and in other ways to give a good account of themselves under war conditions with the minimum of

officering and care such as must be given ordinary recruits. They also know much of organization and discipline. In addition to these fundamentals, most of them have special competence, if not in the accepted work of the soldier, in work no less necessary in military operations, such as mapping and reconnaissance, trail, bridge, and telephone building, signaling, scouting, packing, teaming, auto driving, use of fire arms, feeding and transporting men, etc. Many also have military experience. These qualifications make these men especially valuable.

THE FRUIT TREES OF PICARDY

By Alice Gertrude Field

Last May they held you captive,
Sweet orchard-trees of France,
Like fearless eyes your buds unclosed
On desperate mischance,
Looking on strife and sick heart-break
With gentle, steadfast glance.

The little dark-eyed children
Looked up and smiled at you.
Your gallant branches bloomed in grief,
Like France, gay, brave and true.
Cheered by your snowy burgeoning,
Her sad folk hoped anew.

Today your ravished soil is free,
Slight little trees of France.
Your people keep glad festival
With joyous circumstance,
And you, dear comforters, should toss
In rosy triumph—dance!

Your sacrifice was not in vain,
Brave martyred trees of France,
For your avenging countrymen
Sweep on in stern advance,
And through all time your sweet ghosts breathe
A fragrant Vive la France!

A NEW use for wood has been developed in the making of canoes by a new system. The new idea is the stamping out of the finished canoe, from veneer, instead of the old-fashioned manner of building up a canoe from ribs of prepared wood, and the cutting of the thwarts and gunwales, and the covering of the whole with canvas.

THE New York State College of Forestry has taken up a new line of work, in the opening of a course to teach city forestry, along lines of city forestation on practical lines, arboriculture, park administration and landscape construction. Summer camp work is part of the course, to give the students training in the real out-of-door work of the forest. The forestry school has just issued a technical publication on the hardwood distillation industry in New York, to outline the work being done in this State, which is one of the leading states engaged in this industry. The latest practice in the industry is reviewed as part of the work of assisting in the further development of the industry.

TIMBER CRUISING IN THE PACIFIC NORTHWEST

BY HERMAN H. CHAPMAN

THE enormous size and great value of individual trees in the coast forests of Washington and Oregon have led to the adoption of careful, detailed methods of timber cruising. The old-time cruiser, who produced his results by methods as mysterious as those of the professor of legerdemain, is giving place to the man who has a definite system and does not care who knows it. Timber cruising does not differ from other kinds of inventories or stock taking, except that it is immensely more difficult to obtain accurate and consistent results except at considerable cost.

The fundamental requirement in large and valuable timber is a count which will show the exact number of trees of each species on a "forty." Cruisers who attempt to estimate timber of this character by any shorter method cannot hope to attain even reasonable accuracy.

An example of modern methods is a report sent to the writer by the St. Paul and Tacoma Lumber Company, prepared by their timber inspector, Charles A. Billings, of Olympia, Washington, covering a section or square mile of heavy timber near Everett, Washington. The method employed by



RED CEDAR

This species is the source of nearly all the famous red cedar shingles shipped from the West Coast.



SEMI-MATURE DOUGLAS FIR
This timber is typical of that found in the Puget Sound Region of Washington.

diameter was arrived at, and the average merchantable length to nearest a 16-foot log. From these dimensions the contents of an average tree of this size was computed and the total stand determined in board feet by the Scribner Log Rule. These data were completed separately by species on each $2\frac{1}{2}$ -acre plot, with sixteen plots per forty, and sixteen forties in a section. This requires separate estimates on 256 plots to cover a single section, or over 9000 plots on a township of 36 sections.

The cruiser also estimates the per cent of the stand which will yield logs of three grades, respectively: No. 1, "merchantable," and No. 2, logging conditions are noted, a sketch map is drawn showing



YOUNG DOUGLAS FIR

This timber is mature for cutting and the stand has not yet begun to deteriorate or open up. Cruiser Charles A. Billings in the foreground.

Mr. Billings was to divide each forty-acre tract into sixteen squares of $2\frac{1}{2}$ acres each. The center of each square plot was blazed with a cross and the plot numbered.

Then the cruiser counted every tree of merchantable size by the following classes: Douglas Fir, Young Douglas Fir, Red Cedar, Spruce, Hemlock, Cedar telephone poles, slow growth fir piling. For each of these classes, the average

topography, streams and 50-foot contours, and the stumpage value of the timber is arrived at by determining the cost of logging the tract, and the value of the logs at the mill.

The estimating of timber is far from being a mechanical undertaking. Concerning his methods, Mr. Billings says, "To be a successful estimator of timber in the Puget Sound country requires much experience in actually logging said timber. A person should have had experience in felling and sawing into proper log lengths and measuring same after the hearts have been exposed, and carefully examining all the different indications of defect which appear on the surface of the tree, and which can be detected only by a person having knowledge of said signs, which indicate the condition of the interior. I have had seventeen years' experience in estimating the standing timber and have been able to check my estimates with the actual cut on many thousands of acres. I have compiled a table of the contents of standing trees which have several butts based upon a butt measurement four feet above the ground and under the bark, from thousands of measurements of different trees having different lengths and tapers. All measurements were made upon windfall timber or trees felled and cut up or sawed into log lengths in the logging camps. The top diameter of the first 32-foot log in very large trees is generally reduced about 14 inches for the butt dimension. Taper on each log above may be as much as 6 inches."

"Nearly all the different stands of timber differ owing to soil, exposure and altitude. Some have much longer and smoother bodies with less taper and a greater per cent of No. 1 logs. All this must be determined by the estimator when on the work."

"I do not pretend to know all about the work. Ten years



MATURED DOUGLAS FIR
Stands of this age begin to decline in vigor and are ultimately replaced by hemlock and cedar unless logged or burned.



Giant Red Cedar
This tree is seven feet in diameter and is in a mixed stand with hemlock. Note typical undergrowth of bracken.

ago I considered I knew more about it than I do now. I have since concluded that there is much yet to learn."

The character of the stands requiring this detailed estimate may be judged by the accompanying photographs, which were taken by Mr. Billings on the various plots. There was found to be a total stand of 41,611,000 board feet of timber on this one section, or an average of 65,000 feet per

acre, valued, on the stump, at \$92,974.20 on the basis of stumpage prices varying from \$3.00 per thousand feet for No. 1 fir logs, to 50 cents per thousand for hemlock.

Mr. Billings' work is an example of the highest type of skilled timber estimating in which the cruiser combines the system and routine employed by a technically trained forester with knowledge of the character and defects of the timber. This report and the accompanying photographs were obtained through the courtesy of Mr. E. G. Griggs, of Tacoma, a vice-president of the American Forestry Association.



MORE YOUNG DOUGLAS FIR
In this dense stand the trees average about forty inches on butts, three feet above the ground.

THE VIREOS

(Family Vireonidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

MAY is the month of migration. Ever since the last of February the birds have been moving northward, but it is not until this month that the flood-tide of bird migration passes over us. The early spring migrants are those that winter but a short distance south of their breeding range and have not far to travel, but the last of April and the first of May bring the birds that have been wintering in Central and South America. Wave after wave of bird life pours upon us; the woods and fields

The vireos do not come in a body by themselves but usually are mixed in with the flocks of warblers. They do not even come at the same time. The blue-headed vireo which winters in the Southern States is the first to arrive in the North; then come the warbling and yellow-throated species from Central America, while the red-eyed from South America is last to arrive.

The vireos are not brightly colored birds, but they wear greens, grays, and yellows in modest, pleasing combinations. Although not much larger than their brightly colored congeners, the warblers, they move about much more slowly, peering under leaves, examining crevices in the bark, or gleaning about the outer twigs in a thorough-going manner, usually singing as they go. Their larger heads and heavier bills likewise distinguish them.

With few exceptions the vireos are arboreal birds, fre-



A FEARLESS BLUE-HEADED VIREO ON ITS NEST

All of the vireos are confiding birds and will often allow one to stroke them while on the nest or even take worms from the hand like a pet canary.

are animated with a new influx of life; hedgerows and roadsides resound with song and demand our attention. We can step out into the open almost any cloudy evening, when the birds are flying low to escape the moisture-laden clouds, and hear their calls to one another as they wing their way northward under the protection of darkness. Some of them are flying high, others are flying so low that they barely skim the house-tops and a few ill-fated birds, confused by bright lights, dash themselves to death against tall buildings or become entangled in the meshes of telegraph wires.

The robins and bluebirds and blackbirds have been on their nesting grounds for nearly two months, many of the sparrows, the hawks, and the woodpeckers, have been common for some time, the ducks have come and gone, and now come the big flights of fly-catchers, warblers, orioles, thrushes, and vireos.



VIREO BUILDS FLOOR OVER COWBIRD'S EGG

Nest of a blue-headed vireo showing how a cowbird's egg was kept from hatching by having a floor built over it. The vireos suffer as much as any bird from the parasitism of the cowbird, but sometimes they circumvent disaster in this way.

quenting the shade trees of the city streets or small groves and wood lots, although they are not out of place even in the dense forests. They are almost entirely insectivorous, and to them, as much as to any other group of birds, is given the protection of the foliage. Leaf miners and leaf rollers, caterpillars, elm leaf beetles, gypsy and brown-tail caterpillars, and even the tent caterpillars are acceptable to them. In their seasons the berries of the elder and mulberry, wild cherries and even the hard blue berries of the Virginia creeper attract the vireos and make a welcome variation to the usual diet.

Vireos are great singers. They are singing when they come in the spring, and they continue to sing all summer, even after the exhausting moulting period has caused other

birds to cease. They sing under the hottest noonday sun when other birds are resting, and even on their way back to their winter homes, they indulge in snatches of their cheerful, measured music. Unlike the warblers, their songs are uniformly loud and musical, and though sometimes marred by a discordant chatter, they have a finesse unusual in bird music. Their songs, however, are simple, usually repeating the same phrase over and over with regular rests between each syllable. So measured is the time that it is rather easy to distinguish the songs of the common species by the rate of delivery. The red-eyed vireo, for example, calls: "Look up"—1, 2, 3—"way up"—1, 2, 3—"tree top"—1, 2, 3, etc., while the yellow-throated vireo, which has a somewhat harsher song, delivers it more slowly: "Cherries"—1, 2, 3, 4, 5—"sweet cherries"—1, 2, 3, 4, 5, "have some," etc.

This method of singing has given them the name of "Preacher birds" and, as Wilson Flagg has well said of



BUT THE COWBIRD WAS PERSISTENT

The same nest containing two eggs of the vireo and two more of the cowbird. The cowbird's eggs are larger and heavily speckled. These eggs were removed, but later another cowbird found the nest and the result is shown in the next photograph.

the red-eyed vireo, "his style of preaching is not declamation. Though constantly talking, he takes the part of a deliberate orator, who explains his subject in a few words and then makes a pause for his hearers to reflect upon it." The songs of the warbling and the white-eyed vireos are exceptional, for the former indulges in a single, long, musical warble, similar to the song of the purple finch, except that it has a rising inflection at the end, while the latter, being an excellent mimic, often combines the songs of other birds with his own, into an indescribable jumble of musical cadences.

The nests of vireos are basket-like structures hung in the forks of the smaller branches. They are built of strips of grape vine bark and fibers, such as the milkweed supplies, skilfully fastened together and bound in place by spider or tent caterpillar webs. One can be fairly certain of the species of the nest by its position in the tree or shrub.

The white-eyed vireo, for example, always builds its nest in berry bushes or tangled thickets within a few feet of the ground. The red-eyed vireos nest on the lowest branches of trees or in young saplings from five to ten feet from the ground. The warbling vireo builds high in a full-grown tree toward the tip of the branches, while the yellow-throated builds near the trunk or one of the main branches, hanging its nest in the fork of a small shoot. The eggs of vireos are always white with just a few specks of black about the larger end.



—AND THIS IS THE RESULT

The young cowbird now ready to leave the nest of the blue-headed vireo from which it has long since crowded the rightful young.

The whole vireo family is very commonly parasitized by the cowbird, a species of blackbird, which, like the European cuckoo, builds no nest of its own but always deposits its eggs in the nests of smaller birds. The cowbird's eggs are easily distinguished because they are larger and heavily speckled with brown, but, in spite of the great dissimilarity, the vireo seems not to recognize the difference and never throws the egg from the nest. If, however, the cowbird deposits an egg before any of the vireo eggs have been laid, the vireo seems to realize the intrusion and will often build a floor over the cowbird's egg and thus prevent its hatching, or it may even desert its nest and build another. Apparently the vireos cannot count higher than one, and, while they recognize the difference between an empty nest and one containing an egg, they do not seem to differentiate between one egg and two, or between two and three.

If the cowbird's egg hatches it is seldom that even one of the young vireos reaches maturity, for the young cowbird quickly outstrips them and gets all the food, so that they are either starved to death or crowded from the nest. The vireo, however, is no less faithful to this changeling



A RED-EYED VIREO

This bird is repairing its nest during incubation. The vireos' nests are built of strips of bark and plant fibers skilfully woven together and bound into place by means of spider-webs and the webs of tent caterpillars. Here the bird is repairing its nest that has become loosened by swaying in the wind.

than to her own, in fact, she seems quite proud of her prodigy offspring and continues to answer its cries for food long after the cowbird is larger than its foster parent and should be caring for itself. The accompanying photograph of a blue-headed vireo's nest shows how the first cowbird's egg was buried in the bottom of the nest by the



A YELLOW-THROATED VIREO

This bird is stepping onto its nest in the fork of a chestnut tree about twenty feet from the ground. The yellow-throated vireo is a common bird of the shade trees, even along city streets, where its musical notes are heard much more often than the bird is seen. It hangs its cuplike nest in the fork of a small branch sprouting from one of the main limbs usually toward the center of the tree.

addition of a second floor. Later, after the vireo had deposited two eggs of her own, two more of the cowbird's eggs appeared. These I removed, but, nevertheless, when I returned about three weeks later, hoping to study a family of vireos, one young cowbird was all the vireos had to show for their labors. Still another cowbird's egg had been deposited in the interim and the ugly intruder here pictured had crowded the rightful young from the nest.

All of the vireos are trustful birds, seeming to have little fear of man. They sometimes nest on branches close to windows and often allow one to stroke them when on the nest.

The three commonest vireos are the warbling, red-eyed, and yellow-throated species. The first two resemble each other closely, being greenish above and pure white below. The red-eyed, however, has a grayer crown and a black line through its eye. The warbling vireo usually keeps to the tree tops, where its loud warbling song can be heard even in the heart of big cities, though the bird itself



Photo by G. C. Embody.

A WHITE-EYED VIREO AT ITS NEST
This vireo is an aberrant member of the family, nesting in thickets and berry bushes.

is seldom seen. There, likewise, it hangs its cuplike nest. The red-eyed vireo is more at home among the lower branches or even in the undergrowth of woodlands, although it, too, makes the best of city parks, where it has to consort with the warbling vireo on account of the lack of undergrowth. The yellow-throated vireo is easily distinguished from these two by its yellow throat and breast, resembling more some of the warblers. The blue-headed vireo and the less common Philadelphia vireo are more northern in their breeding range than the others, and prefer woodlands for their homes. The blue-headed species is quite distinct from any of the others with its bluish-gray head and white eye-ring, but the Philadelphia closely resembles the common red-eyed, even in its song. Its under parts, however, are lightly suffused with greenish-yellow, and its song is somewhat weaker and higher pitched. The eastern and southern white-eyed vireo and the Bell's vireo of the Middle West are aberrant members of the

family which frequent thickets and berry patches from which they scold at every passer-by in an amusingly impudent manner. The white-iris of the white-eyed vireo is quite distinct in the fields, indeed much more so than the red iris of the red-eyed species, and gives the bird a quizzical expression.

Several other species of vireos are found in the South

and in the West and their numbers increase through Mexico and Central America, reaching their maximum abundance in the tropics, where the majority of the one hundred or more species are found. Vireos are confined to the New World and find their nearest relatives either with the waxwings or the shrikes.

A FOREST RANGER COURSE FOR THE SOUTHERN APPALACHIANS

THE Lincoln Memorial University in the Cumberland Mountains at Harrogate, near Cumberland Gap, Tennessee, has lately organized under the guidance of Henry S. Graves, Forester of the United States, a department of forestry with the purpose in view of furnishing a training suitable to the needs of farmers and other owners of woodland; one which will equip boys as rangers in government, state, or private employ.

As a forest laboratory, in which the students will do their practical work, the University has secured a timber tract of 2080 acres extending along the picturesque Cumberland Mountains from Cumberland Gap, Tennessee, east into Virginia. This tract will offer many problems for the students to solve. At present the reserve contains many thousand feet of merchantable timber, a large part of which is mature and will be cut as soon as possible.

No attempt will be made to develop a type of forestry school comparable to those in Northern Universities. The course will cover one year of twelve months divided into four terms of three months each. Each term is made a unit in itself so that a student who may have to drop out of the course before its completion will have a definite knowledge about at least some one phase of the practical work which will be of use to him in securing a position.

The largest part of the instruction will be given in the forest or in connection with practical field problems. The course will cover the following subjects:

- Elements of forestry; a class-room course, supplemented by field excursions designed to show the student the fundamental needs and purposes of forestry, the relation of forests to water resources, the effect of forest destruction, the benefits to a community in maintaining forests in a productive condition, etc.

- Forest botany; an elementary course to acquaint the student with the different species of trees and shrubs occurring in the forest, and their distinguishing characteristics.

- Elementary field surveying, designed to train the student in making simple land surveys by the use of an ordinary compass, in simple levelling, etc.

- Forest protection, with emphasis on practical measures to protect forests from fire and depredations of insects.

- Timber cruising and mapping; a practical course to train the student in determining the amount of standing timber on a tract, to appraise its value, and to record the information on maps.

- Logging and scaling; a practical course in methods of logging and measuring the volume of logs.

- Manufacturing and marketing of products; a course especially adapted to the conditions in the Southern Appalachians.

- Silviculture; a course dealing with the methods of the care of woodlots, cutting timber in a way to secure natural reproduction, the making of thinnings to improve the stand, and practical reforestation.

- Forest improvements; a course, principally in the field, in the construction of trails, telephone lines, and other improvements needed in forest protection, and elementary work in the construction of roads.

- Elementary land law; a brief course designed to acquaint the student with the land system of the South and simple land law with particular reference to titles, transfers of property, contracts, etc.

The University is fortunate in being situated as it is among the mountains of northeastern Tennessee, since it draws upon a fine type of men, for forest work, men who are strong, active, used to the forests and mountains and know how to combine their hands and minds in solving the problems placed before them.



LINCOLN MEMORIAL INSTITUTE RANGERS

A group of the boys who are learning enough forestry to give them a working knowledge of the proper way to handle woodlands in connection with farms and also to make them eligible to places as forest rangers.

THE OAHU RAIN FOREST

BY VAUGHAN MACCAUGHEY

YOUR first view of the island of Oahu in the Hawaiian group is predestined to disappointment. During the lazy steamer week of tranquil blue Pacific you have indolently recalled all you ever read or heard of the alluring "South Seas." You picture the coral beaches, the languorous palms, the smiling forest against far purple peaks; surf lullaby and throbbing bird song; hospitable natives whose child-like pleasures and occupations sweetly link them to their bounteous and ever-smiling Nature Mother. Pleasant day dreams, these, for you are sailing to the isle of Paradise.

The last morning of the serene voyage dawns. As you are in your cabin, dressing, and packing your grips, a friend excitedly calls down to you. You rush on deck,—and in that shattering instant your iridescent dream-picture of tropic isle is irretrievably broken! You gaze at arid, weary, time-scarred headlands. A heavy surf beats relentlessly against the barren cliffs. The lonely shore is branded by melancholy sphinx-like craters and black dead lava flows. The bare soil is parched and red, as though burned and reburned in fierce plutonic furnaces. Where are your shimmering forests? Your sunny strands . . . your friendly palms? Here are no signs of habitation, save the lonely lighthouse. It is a dead land—the volcanic fires have long been drawn, leaving to corrosive wind and water the demolition of its clinkered cinder heaps. And this is Paradise Isle!

The steamer, running slowly now, and standing well out from the surf-marked reef, rounds Diamond Head.

With delightful smoothness the panorama is metamorphosed by life and greenery. Now you look far back into magnificent sunny amphitheatres, hung with forest drapery, and scored by shining waterfalls. The valley floors are bright with the vivid green of the wet-land crops; their stately portals open onto the basking lowlands. Bold ridges separate these lovely vales and rise majestically to the cloud-capped mountains of the interior. Your sea-weary eyes are charmed by the rich and diversified green of the unbroken forest, that like a sumptuous tapestry drapes the mountains, ridges, and valley walls. This is Oahu's rain forest—this is the crowning scenic glory of the Purple Isles.

Before one can intelligently view this radiant mountain mantle one must know something of Oahu's volcanic history. This island is formed of two ancient crater masses—Waianae and Koolau. Waianae is much the older of the two and existed long before the Koolau Range rose up out of the sea. In that early period the Waianae supported luxuriant forests, well-watered by abundant rain from the perpetual cloudcap. When the great Koolau volcano reared itself to the windward, it shut off from the Waianae the rain-bearing trade winds. The Waianae thus gradually lost most of their original forest cover; the Koolaus received very heavy precipitation, and were soon mantled by the beautiful humid forest.

My first trip into the Koolau Mountains elucidated the term "rain forest" and the relation of this forest to the zones of plant



DEEP IN THE RAIN FOREST
It is a dwarf forest appearing very rich when viewed from the lowlands but in reality made up of short, gnarled trees and tall, stout shrubs.



LOOKING TOWARDS THE SEA FROM A HIGH RIDGE
During the rainy season in the Rain Forest landslides are common. They usually start near the top of a slope and cut straight narrow wounds down through the forest blanket.

life that lie below it. Leaving Honolulu at early morn, our party of four men traversed the narrow lowland, with its wealth of exotic vegetation—banana plantations, papaia orchards, flooded rice and taro patches, guava thickets, algaroba groves. A half-hour's walk brought us to a grassy foothill—the seaward outpost of one of the long ridges that rise to the main summit of the range. The foothills are dry and hot, and are covered with an uninviting, stultified growth of coarse grasses, thorny lantana, prickly cactus, and other pugnacious weeds. These tough and dogged vagabonds have exterminated from Oahu's lowlands most of the indigenous vegetation.

When we reached the lower skirts of the forest we gave a shout of relief and sat down amidst the fragrant ginger beds in the cool moist shade of a *kukui* grove. The gray trunks, wide-spreading boughs, and shady domes of silver-green foliage were so soothing after the glare and sterility of the foothills that with reluctance we resumed the laborious climb. A few upward steps lifted us from the tranquil twilight of the trees into the brilliant sunshine that poured down upon the ridge trail. The comb of the ridge was very narrow, never exceeding a few feet in width, and dropped abruptly on either side into the deep valleys. The ridge itself was overgrown with bushes and stunted trees.

We were now in the rain forest, the fourth and uppermost of the plant zones that engirdle the mountains. It begins at an elevation of 1500 to 1800 feet, and extends to the ragged skyline of the Koolaus, which reach three thousand feet. The appropriateness of the term "rain forest" soon becomes evident to us. Although but mid-morning, the sunshine was at first deadened and then completely hidden by the dull gray fog that rolled down over the ridge. The cumulus clouds that an hour before

had dazzled us with their high effulgent whiteness, now settled lower and lower over the mountains, concealing the upper slopes and filling the air with wind-driven showers. The rain continued for so long a time that we finally halted and endeavored to find temporary shelter. This proved no easy undertaking, as the ridge trail was exposed to the full blast of the wind. The ground was thoroughly wet, and the rain seemed heavier under the scraggly, crook-armed trees than anywhere else.

We turned our backs against the cold, driving wind and scanned the long ridge that we had ascended. Its foothills were baking in the sunlight! The distant sea was blue and serene, the white beach line, the drowsy palms, the lowlands, were all drenched with sunshine! We, a few miles mountainward, were under the cloud-canopy of the rain forest, and the prey of every pouncing shower. We abandoned our original plan to ascend the summit,—now engulfed in clouds,—and returned to the *kukui* grove. Here we ate our very soggy sandwiches, and in equally soggy shoes and clothing retraced our trail to the sunny lowlands of Honolulu.

This trip was our introduction to the chief factors in the formation of Oahu's forest mantle—abundant fog, frequent rains, temperatures much lower than those prevailing on the subtropic plains. The soil on the steep slopes and ridges is water-soaked throughout the year. The dense, squat, stunted woody mantle that maintains itself

under these strange conditions is itself perpetually humid. The rain forest occupies the region of maximum rainfall, and in this zone the annual precipitation is astounding, attaining a yearly average of several hundred inches.

The continuous humidity of the rain forest encourages a profuse undergrowth of ferns, mosses, liverworts, and other lowly plants. Trunks and branches are envel-



THE TAPESTRY FOREST

Deeply eroded ridges and gulches in the Rain Forest of Oahu Island. So steep are these luxuriously wooded slopes that they have aptly been termed "tapestry forests."



A RADIANT MOUNTAIN MANTLE

A densely wooded ridge in the Rain Forest zone, Oahu Island, elevation about 2200 feet. These forests from a distance look wonderfully rich, but the average height of the forest growth is well under thirty feet.

oped in dense layers of delicate, water-saturated vegetation. One may pull off a great handful of this material and wring a stream of water from it as one would wring a wet sponge. These clumps and festoons are veritable creations of the mist—beautiful translucent green, and exquisitely delicate in the form and texture of their foliage. Many of the epiphytic ferns are so small, fragile and translucent that they resemble large mosses rather than ferns.

The forest is composed of a considerable variety of short, gnarled trees and tall, stout shrubs. In stature it contrasts strikingly with the very tall tropical forests of such regions as the Amazons and Java. It is a dwarf forest, a stunted formation, appearing very rich when viewed from the lowlands, but under close inspection revealing all the ecologic earmarks of restrained development under relatively adverse conditions. The steep slopes which it covers; the thin, wet, humus-lacking soil; the comparatively low temperatures; the poor insulation due to prevailing fogs; the repulsive influence of strong continuous winds; the endless repetition of landslides and reforesting, as the valleys relentlessly eat back into the mountains; all of these conditions have tended to prevent the growth of large trees. The average thickness, or height, of the Oahu forest blanket is well under thirty feet. This contrasts with the splendid *ohia lehua* forests on the island of Hawaii, which rise to a height of one hundred feet, many individual trees attaining one hundred and fifty feet.

In these forests there are absolutely none of the familiar continental trees, and none of Hawaii's indigenous trees occur upon the mainland. The old-time Hawaiians were good woodsmen, and had specific names for most of the trees; for example,—kukui, koa, lehua, hoawa, alani, hame, kawau, olomea, ohe-ohe, lapa-lapa,



FOREST TRAIL THROUGH A KUKUI GROVE

Note the shade and the beautiful undergrowth. Here the rainfall reaches the maximum, the annual precipitation is astounding, attaining a yearly average of several hundred inches.

pukeawe, lama, kopiko, etc. The forest canopy is a rich blending of greens of many hues, but these hues are its only wealth. In blossoms it is poverty-stricken. Like the tropical forests of many other regions, it is a flowerless forest. Not botanically flowerless, for of course every plant at its season puts forth flower and fruit, but flowerless in the artistic sense.

The flowers are, with few exceptions, small, greenish, inconspicuous, infrequent, scentless. One may clamber all day along the steep ridges of Oahu's rain forest, and see scarcely a dozen beautiful blossoms.

Many of the wooded slopes are exceedingly steep. These forested walls are so precipitous, and mask so many impassable cliffs, that the phrase "tapestry forest" correctly designates their aborescent drapery. One's first trips are made in momentary expectation of seeing the thickly wooded cliffsides drop down like a green garment, and expose the naked brown lava-body below. This very stripping off of the forest does occur, not in any spectacular manner, but intermittently here and there throughout the range. The slippery soil is a thin and easily-separated skin over the lava substratum from which it is decomposed. During the rainy season, when the whole range is water-soaked, landslides are common. They usually start near the top of a slope and cut straight narrow wounds down through the forest blanket. Sometimes a single hillside will be scarred by a dozen of these savage claw-marks; adjacent slopes may long remain unscathed. The scars vary in width from twenty to one hundred and fifty feet, and in length from several hundred to a thousand feet. They cut through to bed-rock, like a slash to the bone, and are therefore slow to heal. Little by little the mosses, ferns, and grasses creep over the raw rock, and finally, after many seasons, the moist forest closes above the ancient wound. Thus the perennial green tapestry mends its own rents, and so serenely beautifies the fire-built Pacific Islands.

ON parts of the Angeles National Forest in California the packrats are so abundant that many of the young pines planted by the Forest Service have been killed or injured by the rodents. The damage seems to take place chiefly in the late summer and fall and is more extensive in dry than in wet seasons. It is thought that the rats tear off the tender bark of the trees to obtain moisture at times when water is scarce.

RETURNS from 160 wood-pulp mills throughout the country, received in connection with the census of pulp-wood consumption and wood-pulp production being made by the Forest Service in coöperation with the Newsprint Manufacturers' Association, show that the reporting mills used in 1913, 419,000 cords of wood and had an output of approximately 2,229,000 tons of pulp.



CASCADE PASS, WASHINGTON

Cascade Pass, below Glacier Peak, Washington, is one of the most beautiful and awe-inspiring mountain sights in the Northwest. The peak is a rugged mountain mass, 10,436 feet above sea level, according to the United States Geological Survey, and the so-called "pass" is an eternal glacier, a great river of ice, moving slowly down its steep valley. The timber line creeps up to the very foot of the glacier, represented by majestic mountain spruce and sugar pines 100 and 150 feet in height. The melting ice from the glacier finds its way into the Wenatchee River which, miles further down, is utilized for the irrigation of the fertile valleys of the Evergreen State.

THE SUGAR PINE IDENTIFICATION AND CHARACTERISTICS

BY SAMUEL B. DETWILER

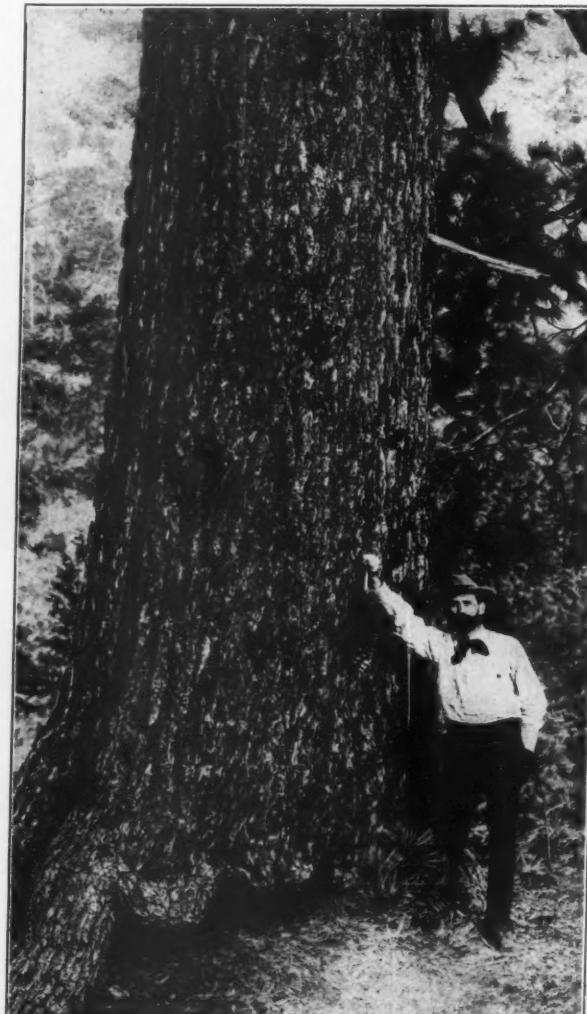
THE "Man of Grass," as the Indians styled David Douglas, the intrepid English plant collector, discovered the Great Sugar Pine ninety years ago. These "truly grand" pines were too tall to climb, so the botanist used his gun to bring down several of the large cones for his collection. The fusillade quickly brought eight painted and well-armed Indians on the scene, who displayed unmistakable signs of hostility. Douglas modestly records the incident in his journal: "I came on an abundance of *Pinus lambertiana*. I put myself in possession of a great number of perfect cones, but circumstances obliged me to leave the ground hastily with only three—a party of eight Indians endeavored to destroy me."

Douglas named this magnificent tree *Pinus lambertiana* in honor of his friend Doctor Lambert, a distinguished botanist and author of a noted work on pines. Forty-two years after Douglas' exciting discovery of this tree, John Muir, a man whom his friends loved to call "John o' the Mountains," made his first trip into the Sierras. He has left us a legacy of the most beautiful and vivid word pictures of our Western wonderlands. At a meeting of the Sierra Club, he gave the following account of his first acquaintance with "the Sun-tree of the Sierras":

"For the first time I saw the giants of the Sierra woods in all their glory. Sugar pines, more than 200 feet high, with their long arms outspread over the spiry silver firs and the yellow pine, libocedrus and Douglas spruce. . . . The sugar pine seemed to me the priest of the woods, ever addressing the surrounding trees—everybody that has ears to hear—and blessing them. Few are

altogether deaf to the preaching of pine trees. Their sermons on the mountains go to our hearts; and if people in general could be got into the woods, even for once, to hear the trees speak for themselves, all difficulties in the way of forest preservation would vanish."

The extreme geographical range of the sugar pine covers a narrow strip about 1000 miles long, extending from Marion county in western Oregon, through the Sierra and Coast Ranges of California to Mount San Pedro in lower California. While it is not entirely a California tree, like the Big Tree, the Golden State contains the principal wealth of sugar pine. Of the three most important lumber-producing trees of California, sugar pine ranks below redwood and western yellow pine in quantity of standing timber and annual output of lumber, but in money value it holds first place. The amount of standing sugar pine timber of commercial value as reported by the Forest Service is about three billion feet in southwestern Oregon and thirty-nine billion feet in California. While there is a large amount of sugar pine in the forests of the Coast Range north of San Francisco, the great bulk of the timber is found in the Sierra Nevada Mountains. The largest individual trees and finest bodies of sugar pine are found on the western slopes of the Sierra Nevada Mountains from Tulare to Eldorado counties, California. The Sierra forests are noted the world over for their variety and magnificence. Helen Hunt Jackson has given us a beautiful description of her first impression of this wonderful region: She says: "Now we began to climb and to enter upon forests—pines and firs and cedars. It seemed as if the whole



A GIANT SUGAR PINE IN THE ANGELES NATIONAL FOREST,
CALIFORNIA

This is a splendid specimen, six feet in diameter, and is typical of the tree at its best. It shows very clearly the characteristic bark, deeply and irregularly furrowed into long, narrow plates, as well as the huge cone, by which the sugar pine may be instantly identified.

world had become forest, we could see off so far through the vistas between the tall, straight, branchless trunks. The great sugar pines were from one hundred to two hundred and twenty feet high, and their lowest branches were sixty to eighty feet from the ground. The cedars and firs and yellow pines were not much shorter.



VETERAN SUGAR PINE NEAR PROSPECT, OREGON

A giant sugar pine, seven feet ten inches in diameter at breast height, growing in the Crater National Forest, Oregon. The clear, straight trunk is characteristic of sugar pines, and is one of the reasons why this species ranks as the most valuable timber tree of the Pacific Coast.

The grandeur of these innumerable colonnades cannot be conceived. It can hardly be realized, even while they are majestically opening, receding, closing, in your very sight. Sometimes a sunbeam will strike on a point so many rods away, down one of these dark aisles, that it is impossible to believe it sunlight at all. Sometimes, through a break in the tree-tops, will gleam snowy peaks of Sierras, hundreds of miles away; but the path to their summits will seem to lead straight through these columns of vivid green. Perspective becomes transfig-

uration, miracle when it deals with such distance, such color and such giant size. It would not have astonished me at any moment, as I gazed reverently out into these measureless cloisters, to have seen beings of Titanic stature moving slowly along, chanting service and swinging incense in some supernatural worship."

Sugar pine is the tallest and largest of all the pines. It sometimes grows to a height of 240 feet with a breast-height diameter of 11 feet. The average sugar pine is 175 feet high and 4½ feet in diameter. The mature trees have straight, cylindrical trunks and frequently are clear of branches for 50 to 80 feet. Young trees have a tapering stem, and the branches develop in whorls of five, so that at first the trees, although graceful and flexible, have the regular, spire-like outline of most young conifers. Old patriarchs resemble the old white pine trees of our Eastern forests in developing a marked individuality of form. The tops become flattened and often develop more on one side than the other because of the constant pressure of the prevailing winds. Here and there great branches feathered with short, pliant tassel-like twigs, reach out at nearly right angles to the trunk, sometimes to a distance of 30 to 40 feet. The title "Priest of Pines" is appropriate for this tree whose giant plumes, aloft upon their mighty shafts, are most suggestive of sublime beauty and tranquillity.

The bark of young trees is thin, smooth and ash-gray in color. Later the bark is thick, deeply and irregularly furrowed into long, narrow plates. The old bark is of an attractive purplish hue which becomes red-brown where the wind blows away the small scales on the surface of the bark. Sugar pine is a member of the white pine group, hence the needle-shaped leaves occur in clusters of five, en-



CONE AND NEEDLES OF THE SUGAR PINE

It requires two years for the seed of the sugar pine to mature, and when fully developed the cones are of startling size—sometimes nearly two feet long, the average length being from 12 to 18 inches. The needles are dark green, stout and stiff and from 2½ to 4 inches long.



AREA OF SUGAR PINE GROWTH

California contains the principal wealth of sugar pine, although commercial stands are found in southwestern Oregon. The extreme geographic range of sugar pine is shown in the outline. The great bulk of the timber is found on the western slopes of the Sierra Nevada Mountains, especially from Tulare to Eldorado Counties, California.

closed at the base in a paper sheath. The dark green needles are $2\frac{1}{2}$ to 4 inches long, stout and stiff. Sugar pine received its name from the resin that exudes from the bark. When it is injured, white, crisp globules are formed which are palatable and sweet to the taste, but which should be eaten in limited quantities.

Early in the spring the light yellow pollen-bearing flowers add a touch of brighter color to the dark foliage. These flowers are one-half inch to an inch long, borne in clusters on the young twigs. The cone-producing flowers are light green, appearing two or more together at the tips of the branches. It requires two years for the seed to mature, and when fully developed the cones are of startling size — sometimes nearly 2 feet long, and with an average length of 12 to 18 inches. Drooping from the extreme ends of the branches, the young green cones resemble the weights of a Swiss clock. When the scales expand to permit the seeds to disperse, the trees resemble huge Christmas trees strikingly decorated with shining brown cone ornaments, making it easy to recognize this tree from near or far. The cones contain 200 to 400 dark brown seeds nearly as large as grains of corn, but plump and containing an edible kernel that is relished by human beings as well as an army of squirrels. The seeds have a short and very broad wing attached to one end. The seed is seldom carried by the wind to a greater distance than the height of the tree.

Sugar pine has a strong, widespread root system, and is not often uprooted by wind storms. As with other forest trees, forest fires, grazing animals, snow and other agencies at times cause serious damage to sugar pines. Insects an-

nually destroy large quantities of merchantable sugar pine timber, the principal losses being due to several kinds of bark borers. At present the damage caused by fungi is of minor importance, but since sugar pine is one of the hosts of the white pine blister disease, there is a possibility that this destructive parasite may be introduced into the West from the eastern white pine region and cause great loss.

Sugar pine is usually found growing with western yellow pine, or Douglas fir, and white fir, and less important species, such as incense cedar and Jeffry pine. Its best growth is where the annual rainfall is 40 inches or more. It has been found growing at an altitude as low as 600 feet above sea level and as high as 11,000 feet. The merchantable stands are found at altitudes of 3,000 to 6,000 feet in the northern Sierras, and from 5,000 to 9,000 feet in the southern Sierras. Young sugar pines require partial shade, but as they mature they demand an increasing amount of light. Rapid growth depends on an adequate supply of moisture in the soil and air. The tree grows on many kinds of soils but avoids hot and dry slopes or wet and poorly-drained situations, and prefers moist, loose, deep sandy loam.

Sugar pine grows most rapidly between the ages of 80 and 100 years. In the virgin forest the average size of a 100-year old tree is 18 inches in diameter, breast height, and 90 feet high. Because of the dense shade, growth in virgin forest is very slow during the first half century. The average height of a 40-year-old tree is only about 5 feet, as determined by numerous measurements made by the Forest Service. Occasionally sugar pines live to be 600 years old, but most of them do not live beyond 500 years.



SUGAR PINES (*PINUS LAMBERTIANA*) NEAR STRAWBERRY, CALIFORNIA

Two sugar pine trees growing in the Stanislaus National Forest, California. Sugar pine belongs to the white pine group, having five leaves in a cluster. In addition to its high commercial value, it is a very beautiful tree. It is gratifying that the Federal Government has declared a quarantine against shipments of white pine, currant and gooseberry nursery stock from the eastern white pine region, to prevent the introduction of the white pine blister disease into the sugar pine forests.

At intervals of 3 to 5 years, middle-aged trees produce a fairly abundant crop of seed, but owing to the large amount of seed eaten by birds, squirrels and other rodents, poor germination and injury to small seedlings by fire, drought, and strong sunlight, there is usually a lack of

native young growth of sugar pine. Planting experiments so far have not been entirely successful. Sugar pine can be grown in Europe and in the eastern United States, but its development is slower and less satisfactory than that of our eastern white pine grown under the same conditions.

COMMERCIAL USES OF SUGAR PINE

THE wood of sugar pine is very similar to that of eastern white pine and has practically the same qualities and uses. The sap wood is white or yellowish white and the heart wood light brown, in some cases tinged with red. Like eastern white pine, one of its most prominent characteristics is that it shrinks, swells and warps but little under varying moisture conditions, is easily worked with tools and is not likely to split when nailed. Smooth and rather fine in texture, it has a beauti-

of the trunks were used and thus thousands of feet of excellent saw timber were left to rot in the woods. The shake maker seldom bought the timber, but cut the sugar pines wherever he chose. At the present time shake making survives only in the remote sections where the portable shingle mill has not found its way, or where dead pines are far from the sawmills and must be utilized in this way to secure part of their value.

Close similarity of the wood to that of the eastern white pine has enabled sugar pine to enter markets which the eastern species can no longer supply. Foreign markets for this lumber have also been developed in recent years.



LOADING CREW AND MICHIGAN WHEELS IN USE IN CALIFORNIA
On land not too steep and rough, sugar pine logs are brought to the railroad by means of big wheels. This photograph shows the stiff-tongue or Michigan logging wheel, delivering a sugar pine log at the landing.

ful light satiny luster when finished. It is resinous and has a pleasing fragrance and does not impart a contaminating flavor to food materials brought into contact with it. It is also fairly durable in contact with the soil.

Sugar pine lumber first came into use shortly after the discovery of gold in California. At first the demand was principally for "shakes" or split shingles which were used not only for roofs but also the sides of cabins. With the need for more pretentious buildings the business of sawing sugar pine lumber developed. Shake making is still practised in California, and, although belonging to a disappearing tribe, the shake maker is as well known and as picturesque a character as the prospector. The average size of a roof shake is 6 inches wide, 32 inches long and one-fourth inch thick. The first requisite in splitting shakes from sugar pine logs is straightness of grain. Many splendid pines, 5 feet or more in diameter, were felled and then discarded by the shake maker because the splitting properties were poor. Of the best trees, only 20 to 50 feet



HUGE SUGAR PINE LOG ON SLIDeway

Five and one-half foot sugar pine log going down slideway, Sierra National Forest, California. The log-chute is made of straight logs, 30 or 60 feet long laid in two parallel rows, about 5 inches apart. The inner surfaces are hewed off and greased. If the grade is over 30 per cent and the logs are greased, they slide of their own accord, otherwise, horses or donkey engines pull them to the mill. The chutes from the woods to the sawmill are often 1½ to 2 miles in length.

On the Pacific Coast sugar pine is used in the manufacture of high grade products for which white pine has been the standard in the eastern United States. The latest and most complete information on sugar pine is contained in a recent publication of the Forest Service,* from which the following account is quoted as furnishing the most accurate data:

"With the advent of the sawmill in California, the more accessible stands of sugar pine were eagerly sought by the lumbermen because of the superior quality of the lumber. Its durability, lightness, and softness as compared with other available woods led to its use for shingles,

* Bulletin No. 426, United States Department of Agriculture.

flumes, sluice boxes, bridges, houses, barns, fences, and numerous other purposes. Shingle manufacture has to some extent replaced shake making. The early demand created by the fruit industry for trays and boxes was met largely by the sugar-pine mills. With increased use prices were stimulated, good grades increased in value, and the lower grades were utilized in box making. Because of its

and water boxes, requiring freedom from taste and permanence, are frequently made of this wood. Its lightness recommends its use for special trunks and sample cases. Its straight grain and permanence give it a place in the manufacture of piano and pipe organ keys and actions, and player pianos; and the same qualities, together with lightness, place it among the best woods for drawing boards and extension level rods.

"Large quantities are used by planing mills in the manufacture of cut siding, interior finish, and moldings. It takes readily the finest enamel finish.

"In addition to the above, sugar pine is used for drainboards, elevator floors, brushes (brush blocks), apiary supplies, machine parts, saddles (saddle trees), shade and map rollers, wood carvings of all kinds, oars, slack cooperage, woodenware, bakers' work boards and troughs, dresser brackets, and small turnings and fencing. A large quantity is made into matches."

Sugar pine sells for \$1.25 to \$4 per thousand feet B.M. "on the stump," depending on the location of the timber and other factors. The average cost of cutting the logs and transporting them to the sawmill is estimated to be about \$5.50, and the cost of manufacturing amounts to about \$3.50 per thousand feet. The average price of sugar pine lumber at various California sawmills ranged from \$21 to \$24 per thousand feet in 1912.

In logging sugar pine on fairly smooth or level land, the lumbermen sometimes make use of pairs of huge wheels, 10 to 12 feet in diameter. The logs are chained to the axle of the wheels and one end raised above ground. They are then pulled by horses to the log chute, railroad or flume. The usual procedure in logging sugar pine, however, is to employ steam donkey engines or "yarders." Steel cables are run out and the logs pulled in from distances ranging up to 2000 feet. Logging railroads are used to carry the logs to the mills whenever possible and the yarders are located along the railroad.

FORESTRY MEETING AT PITTSBURGH

THE Chamber of Commerce of Pittsburgh, well-known as a progressive and business-like body, with a habit of initiating and carrying through to successful completion movements of value to the public, is arranging for a convention of forestry interests to be held at Pittsburgh in June commencing on Thursday, June 21st and continuing through the 23rd.

Pittsburgh will afford an excellent central meeting place for forestry organizations from the East, South, and Middle West, and cordial invitations are being sent out by the Chamber of Commerce to State Forestry Departments, and to National and State Forestry organizations, to join in the Conference. The meetings for the reading and discussion of papers will be held in the commodious assembly hall of the Chamber of Commerce, and excursions to points of interest in the vicinity are contemplated. Well ordered local arrangements are being made to minister to and promote the comfort and pleasure of those attending, and the proposed gathering is commended to all persons engaged or interested in forestry and its promotion.

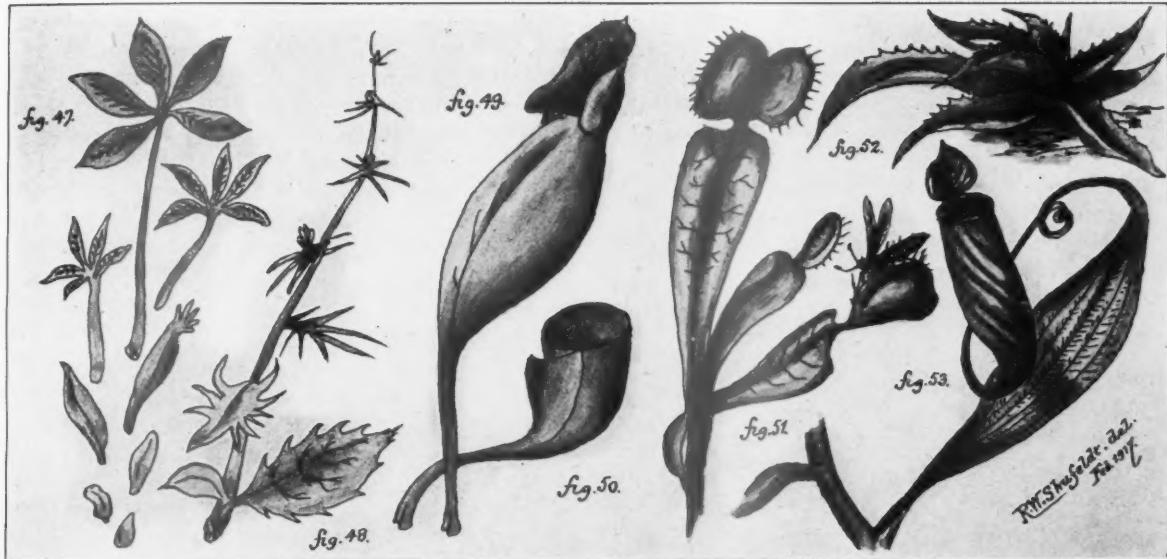


TIMBER FALLERS AT WORK ON A BIG SUGAR PINE IN SISKIYOU COUNTY, CALIFORNIA

The beginning of the end of a sugar pine tree. The "fallers" have cut away the thick bark and undercut the trunk in the direction it is to fall, and they are ready to use the ten-foot cross-cut saw to bring the giant to earth. Additional men are needed to cut the trees into logs. Ordinarily such a crew will cut 35,000 feet to 150,000 feet B.M. of logs in a day, or enough to keep a fair-sized sawmill busy.

color, lightness, and freedom from taste and odor, sugar pine has remained a favorite with raisin packers. Some mills work a portion of their output into raisin trays, some specialize in raisin boxes, and nearly all utilize their poorer grades for box shooks or dispose of them to box makers. About 65,000,000 feet are used in California in bridge construction, sluicing, dimension stock, and general building material.

"Because of its straightness, softness, freedom from warping and shrinkage, splendid service when exposed to weather, and fine finishing qualities, sugar pine is a very important wood in the manufacture of special order sash, doors, and blinds, decks of boats, and general millwork. These same qualities make it valuable for frames and stairwork. For pattern and model making, which require woods easily worked, glued, and nailed, it is a close second to white pine. Fixture manufacturers use it for altars, beading, show cases, counters, veneer cores, shelving, and drawers. Freedom from taste and odor makes it especially valuable for druggists' drawers, for compartments for spices, coffee, tea, rice, sugar, and other provisions, and for shelving. Furniture manufacturers turn it into backing, built-in dressers, sideboards, carved work, core stock, table frames, and tops. Tanks, hot-grease vats, troughs,



THE ILLUSTRATED GLOSSARY—TRANSFORMED OR SPECIAL FORMS OF LEAVES

Figure 47. Leaves are transformed in many ways, as the scales that cover buds may, in developing, become true leaves. One of the best examples of this is the Low Sweet Buckeye of the South, shown in the figure, where the passage from mere bud-scales to a perfect, palmate leaf of five leaflets is shown; or, leaves may pass into spines, a good example of which is furnished by the summer shoot of the Barberry (Fig. 48). As already shown, tendrils are likewise transformed leaves. The Common Pitcher Plant has the leaves modified to form a curious "pitcher" (*Sarracenia*), Fig. 49—one being seen cut across in Fig. 50. It is also called the Side-saddle Flower, or Huntsman's Cup. Most extra-

ordinary of all is the famous "Venus's Fly-Trap" (*Dionaea muscipula*) found only near Wilmington, N. C. Its leaves are modified to catch flies and other small insects, and to digest them. There is a remarkable "pitcher plant" in India (Fig. 53, *Nepenthes*), wherein the leaves contract distally to become a climbing tendril, and at the farther end of this a pitcher, with a true, hinged lid, is developed. This plant is sometimes found in American conservatories. Then, finally, leaves may be so transformed as to become depositories for nourishment for the entire plant, as is the case in the Agave or Century Plant, here shown, much reduced, in Fig. 52 (*A. americana*).

DAISIES, CORN COCKLE, BUGLOSS, AND OTHER SUMMER FLOWERS

BY DR. R. W. SHUFELDT, C. M. Z. S.

THROUGHOUT the central section of the country, even as far as the Pacific Coast region, the month of May is one of the most charming of all the year. Summer has surely come, and the woods and fields, with their thousands of denizens, are thoroughly awake. To be sure, along the Gulf tier of states, it is past or fully into what is midsummer here; while, traveling along the Canadian boundary line, one might meet with snow storms in various localities. Heavy snow storms have been known to occur in Wyoming in August; on the other hand, a member of the Association sent AMERICAN FORESTRY, during the middle of last March, a milkweed from central Florida, just about to bloom, having collected it near Haines City. The birds in that region were then raising their second brood, while in northern Dakota they were hardly ready to begin their nests for the first one. Most young birds, through the central section referred to, are, as a rule, at the stage of the elegant, little Wood Thrush seen in Figure 4; he has only been a day or so out of the nest, and the Ox-eye Daisies, in the southern part of this zone, are already coming out into blossom (Fig. 1), that is, toward the latter part of May. In New England this flower does not begin to blossom much before the first week in June, continuing to do so until the end of August, though stragglers may be seen until pretty late in the autumn.

This common white daisy of ours has been the theme for many, many pens, and its literature extends back into the days of Colonial history of the United States. It is well to know that the plant originally came from Europe, probably introduced by the early colonists. This will account for its still being confounded, in some quarters, with the English daisy—an entirely different plant, with a very different flower.

Besides being called the White Daisy, it has also received the name of Ox-eye Daisy; the White-weed; Marguerite; Love-me, love-me-not; and perhaps other names. It belongs in the genus *Chrysanthemum*, being generally known as *C. leucanthemum* of Linnaeus, and there is at least one variety of it (*C. l. pinnatifidum*), a very abundant subspecies in fields and meadows throughout the northeast section of the Union, where it is most heartily detested by all farmers and agriculturists. In addition to this variety, there is the Corn Chrysanthemum (*C. segetum*) and two other species known as the Feverfew (*C. parthenium*) and the Mint Geranium or Costmary (*C. balsamita*), which latter was introduced from Asia. These last species are all garden escapes; they are spreading over the country in many places, and at a pretty rapid rate in some localities. It is hardly necessary to say that the generic term *Chrysanthemum* is from a Greek word meaning golden flower, referring to the yellow or orange center of the American daisy.

Mathews gives us a pretty good figure of the Feverfew just referred to, which is a tall, branching species, with small flowers; the plant does not occur south of New Jersey. This terse writer dismisses the common daisy in a few words—all of them true enough—when he says: "The commonest of all common weeds of the fields and wayside, often called Farmer's Curse, yet a prime favorite with children and artists! The flower's form is a *summum bonum* of simplicity and decorative beauty. The orange-yellow disk, depressed in the center, is formed of perfect flowers; the white rays are pistillate. The dark green leaves are ornamenteally lobed. 15-25 inches high."

By all odds the best way to study daisies is to get right into a big field of them, such as is here shown in Figure 1. The first thing that will come to mind of many is the old story of Goethe's Marguerite; and, as you ramble among them, you can almost catch the words: "He loves me, he loves me not"—for so said the maiden in "Faust," as she plucked and let fall, one by one, the snow-white rays of the flower she held in her hand. There is nothing more beautiful in all the world of wild flowers than a big meadow of these very daisies in full bloom; and if the warm sunshine of early summer is added to them, with the rollicking song of the bobolinks thrown in, what have we, among all scenes of the kind, that is more enchanting throughout nature?

If you pull up one of these plants, you will see at once that its stalk is smooth and high, and may be lengthwise grooved. Occasionally you will meet with a branched specimen, but not often. The stalk and leaves are of a rather light green color, the leaves being alternately arranged on the stalk, snugly clasping it below. Sometimes double flowers will be met with, and by flowers is meant the entire affair that caps the upper end of the stalk. This is said for the reason that the true flowers are the minute, yellow, tubular growths that form the depressed, subcircular center, around which are arrayed the white, false "petals" or rays. This central disk becomes conical as the season advances, and a full account of its structure would indeed make quite a chapter. The

cup in which this yellow disk of closely crowded florets is found is made up of a mat of green bracts, closely packed together, all being finely pointed at their free ends. One quaint writer at hand says of the foliage of the white daisy that "its leafage is interesting and individual in gesture."

The white female florets, generally about twenty-five in number, are stamenless, and, beyond their beauty, possess no utility other than to attract insects to the yellow circlet of true flowers they surround. "Inside each of these tiny yellow tubes stand the stamens," says Neltje Blanchan, "literally putting their heads together. As the pistil within the ring of stamens develops and rises through their midst, two little hair-brushes on its tip sweep the pollen from their anthers, as a rounded brush would remove the soot from a lamp chimney. Now the pollen is elevated to a point where any insect crawling over the floret must remove it. The pollen gone, the pistil



A FIELD OF WHITE OR OX-EYE DAISIES IN MAY

FIG. 1.—Daisies belong to the *Compositae* or Composite family, one of the largest groups of plants in this country including, as it does, a great variety of species. Among these are the familiar Golden-rods, Asters, Cockleburs, Sunflowers and their numerous allies, Thistles, and many others. The word Daisy finds its origin in "Day's Eye," the flower of Europe (*Bellis perennis*), a pink and white flower that closes in the evening and opens at daylight.

now spreads its two arms that were kept tightly closed together while any danger of self-fertilization lasted. Their surfaces become sticky, in that pollen brought from another flower may adhere to them. Notice that the pistils in the white ray florets have no hair-brushes on their tips, because, no stamens being there, there is no pollen to be swept out. Because daisies are among the most conspicuous of flowers, and have facilitated dining their visitors by offering them countless cups of refreshment that may be drained with a minimum loss of time, almost every insect on wings alights on them sooner or later. In short, they run their business on the principle of a co-operative department store. Immense quantities of the most vigorous, because cross-fertilized, seed being set in every patch, small wonder that our fields are white with daisies—a long and merry life to them." What this close student of American flowers says here will apply, with great truth, to a very large number of our *Compositae*; for, as a matter of fact, it applies to Asters, Sunflowers, and their multitudinous allies and representatives.

Passing to another group, we find an interesting one in the Pink family, which bears the scientific name of

Caryophyllaceæ. According to Gray, this contains some fourteen genera, split into two tribes. Perhaps the best forms in it known to the nature student are the Chick-weeds, Campions, and a few others. In this group there is, however, one very well-known plant, not only to those who go afield to study our wild flowers, but to farmers and to many foresters as well. Reference is made to the Corn Cockle (*Agrostemma githago*), an excellent example of which is shown in Figure 2; this is another plant introduced from Europe. The scentless flowers, which are of



FLOWERS AND SEED-PODS OF CORN COCKLE (*AGROSTEMMA GITHAGO*)

FIG. 2.—This is an annual that was introduced from Europe, and it is a part of the grain fields in this country. The flowers are of a pretty magenta shade and rather showy. The plant is straight, branched, with densely hairy stems. Note the long, linear sepals extending beyond the five petals. Leaves linear. Stamens ten. Grows to be nearly a yard high. The leaves are very narrow, long, opposite, and of a pale green color. The large black fly seen resting on one of the stems is *Cuterebra cuniculi*, so named because its larvae are bred beneath the skin of rabbits.

a bright crimson-purple color, appear late in May in the South, but not until July or August in the northern States. The example given in Figure 2 presents not only the flowers but also specimens of the seed-pods at various stages of their development. It will be noted that the

flowers are single and terminal on the stems. There is a large calyx, the five linear lobes of which are longer than the five rounded petals of the corolla. There is one pistil and ten stamens, with their five styles. The hairy, pale



BUGLOSS, A HANDSOME WAYSIDE FLOWER (*ECHIUM VULGARE*)

FIG. 3.—We find two plants in the Borage family (*Boraginaceæ*) to which we apply the name of Bugloss; they belong to different genera. There is the Small Bugloss (*Lycopsis arvensis*), and the one shown in this figure, which is Viper's Bugloss, also called Blue-Weed and Blue-Devil (*Echium vulgare*). This is a magnificent specimen collected early in the summer near Washington, D. C., and photographed by the author. This plant is found flourishing along roadsides, railroad-tracks, and in waste meadows, being abundant in some sections of the country and rare in others. It escaped from England, and is common in some parts of Europe and Asia. Bugloss flowers of this species are pink in the bud, come out blue, then turning to a reddish purple. Their form, as well as that of the leaves and stem, is well shown in the picture.

green, linear-lanceolate leaves are opposite, while the stout and erect stem is four-angled, and will be frequently seen to branch.

Corn Cockle plants sometimes occur in many thousands in the grain fields anywhere over their range, which is pretty general; and, while detested by the farmer as noxious weeds, the sight they present to the lover of wild flowers is certainly a beautiful one. They are often met with along roadsides, and it was in such a place that I found the one I photographed for Figure 2.

When the farmer takes in his wheat or other grain, the Corn Cockle seeds often get mixed up with it, which is unfortunate, as it contains a poisonous element known

as saponin. This, when inhaled, will cause one to sneeze most violently; and as the saponin is entirely soluble in water, it has a most deleterious effect when taken into the system, producing a very unpleasant disease which may become chronic. Therefore, ground-up Corn Cockle seed will ruin all kinds of flour of which we make bread. The very mention of the name Corn Cockle will set a miller's teeth on edge, and is likely to call forth some pretty strong language. The plant may grow to be a yard or more high; it is fertilized by certain moths and



YOUNG OF ONE OF OUR FAVORITE SONGSTERS

FIG. 4.—There are other living things to be found in the woods in May beside flowers, and those frequently in the open will be sure to meet the one when out for the other. Indeed, botanizers cannot go far afield in May, in most sections of the country, without coming across various young birds that hatch out during that month. The one here shown is the young of our favorite thrush, the Wood Thrush (*Hylocichla mustelina*), that grand songster which enlivens the woodlands with his ringing, bell-like notes as the sun nears the horizon during the entire month of May, not to say far into the summer. There are other beautiful thrushes in our avifauna related to the Wood Thrush, while the Robin, Brown Thrasher, and Catbird are near allies.

butterflies, and especially by the night-flying moth *Dianthæcia*, the larvæ of which subsist upon its unripe seeds.

In the Borage family (*Boraginaceæ*) we have another beautiful plant that was introduced from Europe several centuries ago, strictly speaking, from England, along about 1683, at a time when it was nearly exterminated there. Reference is made to the elegant "weed" generally known as Viper's Bugloss, a splendid specimen of which is here shown in Figure 3. This is the *Echium vulgare* of the botanists, and it receives its name Viper from a writer of ancient history, Dioscorides, who apparently was the first to note the resemblance to a snake's head in the side view of the flower. Since then, many vernacular names have been bestowed upon it, as Blue-Weed, Viper's Herb

or Grass, Snake flower, and Blue-thistle. Authors also give Blue-Devil, Blue-Violet, and so on. It ranges from New England southward, being abundant in some localities, but more than scarce in others, especially as we pro-



FINE EXAMPLE OF A WILLOW IN BLOSSOM

FIG. 5.—The Willow family (*Salicaceæ*) is a very puzzling one to study. There are many varieties and species of them in this country, and they not infrequently hybridize. Most of them flower out quite early, as the one here shown, which exhibits the flowers of the Silky Willow (*Salix sericea*), a large shrub growing in wet places from New Brunswick southward to North Carolina, and westward to Michigan. The side view of the large American moth here shown is a specimen of a female "Spice-bush Silk-moth (*Callosamia promethea*), which emerged from its cocoon in the writer's study early in the spring. Holland, in his *Moth Book*, says: "Every country boy who lives in the Atlantic States is familiar with the cocoons, which in winter and spring he has found hanging from the twigs of the spice-bush, the sassafras, and other trees. As they dangle in the wind they are easily detected, though they are often wrapped in the dead leaf in which the caterpillar originally spun them." (Pp. 84, 85.)

ceed southward. Late in May or early in June we may find it in bloom as far south as southern Maryland. Along railroad tracks are good places to search for it. Alice Lounsberry says: "When growing along the roadsides, its extreme hairiness attracts an immense amount of dust, and not until it has been shaken, or washed off, is the prettiness of the blossoms seen."

Bugloss buds are of a pink color, but the small, scentless flowers, when they open, are of a brilliant blue. They are thickly arranged on one side of the stem, which latter is hairy and ornamented with minute, dark-colored specks. The five-lobed corolla is of a conical form, and from it protrude the red, exerted, five unequal stamens. More-



GOLDEN-KNEE IN FLOWER

FIG. 6.—We have here a typical flower of the month of May, known as the Golden-Knee (*Chrysogonum virginianum*), a representative of the great Composite family (*Compositæ*). It is found only from southern Pennsylvania to Florida, and this is probably the first published photograph of it, the specimen having been collected at Great Falls, Maryland. Gray's specimen was found at "High Island at the Falls of the Potomac." It is a low-growing plant, rarely attaining a height of a foot and a half, generally less. It is a very striking flower in the woods on account of its brilliant orange, five-petaled involucle, which is silky and fluted.

over, we may note by the aid of our hand-lens that there are but two styles and one pistil, while the calyx is five parted. The lanceolate leaves are alternate, hairy, and of a rather light green. Bugloss may grow to be over two feet in height—indeed, I have seen some plants fully a yard high. Gray describes the plant as a "rough bristly biennial," the "nutlets roughened or wrinkled, fixed by a flat base." The fertilization of this plant is an interesting story, but too long to recite here; it may be said, however, that, through its evolution, Bugloss has entirely lost the power of fertilizing itself.

Coming back to the *Compositæ* for a moment, it is quite surprising how our descriptive botanists will sometimes omit a plant, which in some localities is more than abundant. A good example of this is seen in our Golden-Knee (*Chrysogonum virginianum*), which has been overlooked in all the books on flowers at hand, save in Gray's

last *Manual*. Why it should be called Golden-Knee is hard to say; and, as a matter of fact, the term is a mere translation of the two Greek words composing its generic name. In early May it is a very common flower along the Potomac river, in Virginia as well as in Maryland and in some sections of the District of Columbia. Even Gray cites it as occurring on "High Island at the Falls of the Potomac" (p. 826), but here he especially refers to a variety of it named by him *C. v. dentatum*. This variety is said to have acute leaves that are of a deltoid-ovate form, and coarsely toothed along their margins. As a rule the leaves are as we see them in Figure 6,—that is, ovate for the most part, and very rarely cordate. One cannot miss recognizing this beautiful plant when it is in flower in the woods; its brilliant yellow blossoms and hairy stems will go a long ways towards this; and when we note the long peduncles to the flowers, and the long-petioled leaves—the petioles being hairy as in the case of the stems—we may be pretty certain that a Golden-Knee is the plant before us. As with so many other *Compositæ*, the true flowers, of which there are a great many, make up the center of the blossom, the five yellow rays (not petals) being pistillate and fertile. This perennial herb presents not a few other diagnostic characters; but, in view of what has just been given, it will not be necessary to enumerate them at this time. *Chrysogonum* rarely attains a height to exceed fourteen or fifteen inches, the average plant being about a foot high.

THE FORESTRY GUY

By Arthur Chapman

A knightly figure amid the green,
In khaki instead of mail,
A face of bronze, eyes quick and keen—
Swift hoofbeats on the trail;
A home in the saddle through summer days,
A bed 'neath the evening sky;
Who is it that travels the silent ways?
He's only a forestry guy.

A camp on the heights, where snowbanks gleam;
A pack-horse that's grazing near;
No sound save the sound of the mountain stream—
The town sends no echo here;
A figure bathed in the sunset's fires;
Who dwells on these peaks so high?
Who travels amid these granite spires?
He's only a forestry guy.

A tendril of smoke in the valley wide,
A flame that is fanned by the breeze;
A break-neck dash down the mountain side
And a fight for the living trees;
A fight that is won, though the price is dear;
There are scars ere the red flames die;
Who's it that dices with death each year?
He's only a forestry guy.

—From the April edition of "The Teepee Book."

FORESTRY FOR BOYS AND GIRLS

BY BRISTOW ADAMS

SOME FOREST HISTORY



HE gorge is roaring to-night, and I can hear it plainly as I sit writing, even though the windows are closed. While it is spring, there is still a chill in the air and frosts are yet common. But the days

are fine so that we can all walk abroad and seek out the first spring flowers. When we were out today we could smell the scent of new earth almost as if we were following the plow; yet there was no earth turned, and we noted that the odor came from the gorge itself, as the water carried down the flood that came from the thawing ground. The spray from the falls tainted the air with the good earthy smell, but I was sorry to know that all that good earth was going to waste. The falls made a grand sight with so much water going over them, but were not lace-like and white as they are in summer. As Everett said, they looked "like a great flood of chocolate with whipped cream."

The water that trickles down the sides of the gorge, where it is too steep to have farm land, is crystal clear as it flows from the mosses, ferns, Canada yew, and other undergrowth. The hemlocks, pines, ash trees, chestnuts, oaks, maples, and hickories find a foothold wherever they can, and cling along the ledges. From a distance the gorge is a dark blue-gray in winter, and a strip of deep green in the summer, where the bordering trees stand out in the midst of the upland fields on either side. As we walked, we talked, and I made a guess that when the Indians lived here the water did not come down in such floods and did not get so muddy.

AT ONCE the boys were filled with questionings: "Did the Indians ever really live here? How could they keep the water from being muddy? What kind of Indians were they? Did they have bow'n'arrows?" And there were about twenty more, all in a breath!

"Hold on a minute," said I, "this is history you are getting into, and Gertrude hates history."

"I should say I do," replied Gertrude, "nothing but dates, and names of old-time ginks, and fights!"

Somehow, I could not quite disagree with the younger girl, because I had seen her trying to learn some of these same names and dates. As for myself, there is only one date that I am sure of in American history, and that is the landing of the Pilgrims in 1620. The reason I know that is because I had to stay in after school, when I was nine years old, and write "The Pilgrims landed in 1620" five hundred times before I could go out into just such a fine spring day as this has been. But I remember those Pilgrims and the time they landed to this very day.

Gertrude's mind was diverted from history in a moment, and she came down to present-day facts all of a sudden. "You ought not to fuss at us for getting kept in after school," said she, "because you did it your own self."

Everett came to the rescue with further questions about the Indians, and about what they had to do with the clearness of the water; so I was glad to try to satisfy his curiosity in some such way as this:

WHEN those Pilgrim Fathers landed, there were not so very many people in this country, and these were the Indians. They did not have large farms or cities as we have. They had villages, and in the level spaces, like the low land near the head of the lake, they grew some corn and tobacco, and a few other crops. All the rest was forest, where

they hunted, and through which they had trails from village to village, and from one lake or stream to another.

ALL around the little settlements made by those who first came to this country were these giant forests, and in the forests were Indians, bears, panthers, wolves, and wildcats. Is it any wonder that the settlers cut down the trees around their houses, to clear land for growing crops, and to make open spaces across which the Indians and the beasts could not pass without being seen, so there would be warning if they came as enemies? The forest supplied them with wood for building their houses and their forts, and with fuel to keep them warm and to cook their food. But there were too many trees, so the thing to do was to cut them down. The woods stretched away to the west, almost unbroken from the Atlantic to the Mississippi; then came the great prairies which were treeless then as now, and beyond them the forests of the Rocky Mountains and of the Pacific slope.

These were the largest and most useful forests in the world, and they covered between eight million and nine million acres. You do not know how big a space that is, and I do not know just how to explain it to you; but the main thing is that we have something more than half that many acres still left in forest. Yet it is not the forest that it used to be, and while we have more than half of the land still covered with trees that was covered by the first forests, they have been so cut and burned that there is much less than half of the timber standing than there was then. In other words, we have a lot of waste land now that is not growing either trees or crops, but only scrub stuff.

AT this point Everett broke in to ask again what all this had to do with the Indians. So I told him that the country all around us had once belonged to the Iroquois Indians, who were a very brave and fine lot of people. They had their corn fields in the valley below where our house stands, but all the hill country was in deep woods, where they could hunt bear and deer. The very beautiful valley

to the southeast of us, that we know now as Pony Hollow, was the vale where the Saponis lived, another Indian tribe; but most of us have forgotten all about them and even their name has been changed to "Pony" because we are used to that word.

Rabbits, squirrels, wild turkeys, and all sorts of small animals and birds, as well as the larger ones, furnished them with food, and there were many fine berries. We can still find the arrow heads, large or small, depending on the game to be brought down, and we can still find mounds which marked their villages. Some of these mounds are remarkable, and one that I have seen on the campus of the University of Wisconsin is a clear representation of a bird in flight, with wings outstretched.

Mr. Harry Knight, one of our neighbors, has worked out the Indian method of making arrow heads, and finds that they did not chip the flints with other stones, nor with cold water suddenly dashed on stones which had been heated in the fire. He can make flint arrowheads that can not be told from the ones the Indians made three hundred years ago, and he does it by flaking off the flint with a piece of bone or even a piece of wood. He says he is sure that this is the way the Indians made them, because it is the only way that he can get the same kind of a chip that shows on the original arrowheads; more than that, no one has ever found any tool for arrowhead-making, and this seems to prove that the tool must have been of wood or bone, or some substance that would decay with time.

The children got so interested in the question of arrowheads that I thought they would forget about the clear water; but Everett called us back to it, and I explained that the bare upland fields and the gullied roads were all covered with trees at the time the Indians were here, and that the water flowed clearly from them, just as it does from the oozy places in the sides of the gorge. Most of these steep hillsides ought to be in woods now, and the woods should be fully stocked with healthy trees, instead of being scrubby and fit for little but firewood, and a poor grade of firewood at that.

COMMUNITY SPIRIT SAVED THE TREES

BY GAYNE T. K. NORTON

AT first glance an intimate connection between trees, subway construction, community spirit and the bettering of unpleasant conditions in everyday life does not appear; yet, because of a few elms and a bit of subway construction, the people of Brooklyn did themselves a tremendous favor. They proved the existence of community spirit in the borough—absolutely the one thing New York needs most.

They demanded a change in subway construction to save the trees and expected to pay some \$500,000 for it. After legal battles and the loss of a few trees their demands were granted, and, instead of adding a half million dollars to the construction costs, that amount was saved as a result. The economic importance of trees has long been

recognized, but in this instance every one of the elms saved is worth more than its weight in gold, for they have become living monuments, testifying to the power of community spirit. The very fact that they remain standing should furnish incentive to Brooklynites, and others, to attack and rid the community of many social problems. Here is the story of the elms and the all-important lesson they are preaching:

The present subway system is to be continued along Eastern Parkway under ground to finally become an elevated line in the neighborhood of Buffalo avenue. The original plans called for a 4-track system. Brooklyn wanted the subway badly, but when the people learned its building was to cost more than a thousand veteran



Official Public Service Commission Photograph.

HOW BROOKLYN SAVED ITS NOBLE ELMS

Community spirit in the Borough of Brooklyn, New York City, saved these elms, some eight hundred in all, from destruction by subway contractors.

elms and the beauty of the Parkway, besides the millions of dollars, they objected, and determined to save the trees and beauty—and they did.

Petitions were signed, street corner meetings were held, and in other ways the people showed how they felt and what they wanted. It was a long fight; there were hearings galore, and it continued until the work began. By this time Park Commissioner Ingersoll had a new set of plans ready to submit to the Public Service Commission. The people kept pounding hard and the new plans were adopted, though the destruction continued until they went into effect.

The contracts now call for double-decked track construction. The work is being pushed from an open cut, and men from the Park department are on guard, making sure that only the trees specified are taken out. Because of the new contracts more than 800 trees are saved, as

well as a half million dollars in construction. Comparatively few have been cut, but the stations doomed a number. The contractors are required to replace all taken out. All the trees have been inspected and arranged in three classes: those that must be saved; those that should be saved, and those that must go. In some places novel engineering tactics were used in "shoring up" the roots exposed by the excavation.

At first the contractors looked askance at this idea of changing approved plans to save trees; they thought it would mean added trouble and expense, but when they felt the force of the public will, objections were no longer offered. The change proved to be an advantage and saving, and their present attitude may be judged by the action of the Intercontinental Construction Company, which was given permission to cut 145 trees and found it necessary to cut only 100.

AN EPOCH-MAKING CONFERENCE

BY HERMAN H. CHAPMAN

ON April 11, 12 and 13, at New Orleans, Louisiana, there was held a meeting, termed the Cut-over Land Conference of the South, under the auspices of the Southern Pine Association, of New Orleans, and the Southern Settlement and Development Association of Baltimore. The sessions, which lasted for three days, were remarkable for the representative character and earnestness of the delegates in attendance and the number of notable men on the program, and the character of the papers and talks.

The addresses might be classed in three groups: patriotic, scientific, and practical. Honorable Carl Vrooman, Assistant Secretary of Agriculture, struck the keynote in his talk on "Agriculture from a National Standpoint." He vividly impressed upon his hearers the vital importance of food production in the present world crisis. On the South, in particular, rests a great responsibility. At present, over \$700,000,000 of food products are imported into this region from other states. This year the South must feed herself and in this way release an equivalent amount of food to supply our allies in the struggle. Mr. Vrooman emphasized the need for a careful classification of the cut-over lands into those suitable for agriculture, and those best fitted for the production of timber crops.

Patriotism found a silver-tongued exponent in Governor Charles S. Brough, of Arkansas. Southern oratory deserves its reputation if it even approaches the standard set by this able representative of the new South. The governor cited the Book of Revelation, in a prophecy of the great part America was to play in the future. "And a woman shall go forth into the wilderness,—and on a barren rock shall bring forth a child,—and this child shall rule the world." His interpretation of this prophecy—that on Plymouth Rock, in the New England wilderness, the child, America, was born, destined to lead the world in the establishment of free government,—was a thought worth more than passing notice.

The convention then took up the second phase,—a scientific discussion of the possibilities of cut-over lands. The fundamental question, that of the soils and their characteristics, was most ably treated by Mr. C. F. Marbut, of the Bureau of Soils, Department of Agriculture. The speaker dealt only with the so-called "coastal plains" soils, omitting the alluvial lands of the Mississippi Valley. Only the portions not already developed as farms were included—and in this part of the South—for the States of Texas, Arkansas, Louisiana, Mississippi and Alabama, the undeveloped land occupies from two to three times the area of farms under cultivation. These unimproved areas Mr. Marbut divided into four classes of soil—sandy loam, constituting the best type of land for permanent agriculture; wet and heavy land, suitable more largely for grazing; sandy land, on which truck crops and cotton can be raised, and rough or broken land, unsuitable for agriculture, on which forests should be the permanent crop. The areas in each of these classifications are roughly 25 per cent. The total cut-over area, as brought out by other speakers, is now 76,000,000 acres, and will in time amount to 250,000,000 acres. On the basis of this classification, there probably exists from 40,000,000 to 50,000,000 acres of permanent forest land in the Southern states. A great deal of attention was devoted to the livestock industry, and the grazing problem. In discussing this question, the convention had the testimony not only of such experts as Dr. C. V. Piper, Chief Agrostologist of the Bureau of Plant Industry, Mr. George M. Rommel, Chief of the Animal Husbandry Division of the Department of Agriculture, but of several experts connected with the state agricultural departments, and the testimony of a number of owners of cut-over lands who had experimented with livestock. No attempt was made to introduce any of the exaggerated advertising common to the booster and land-speculator, but the speakers talked facts, and the audience got down

to the bed rock of actual experience. It was brought out that the grazing on cut-over pine lands required from seven to ten acres to support a cow through the season, and that a feeding period of three months was necessary. Cattle turned out to rustle through the winter, after frost had killed the grasses, frequently starved to death, and at best made very slow growth. The South demands a new standard of management for success in cattle feeding and this new era will be ushered in by the use of the silo and winter forage crops. The estimates of value placed on grazing were from 15 to 25 cents per acre.

The experience talks, by owners of cut-over lands, formed the third great feature of this conference. The most typical and enlightening of these was an impromptu narrative by Mr. Alex K. Sessoms, President of the South Georgia Land Owners' Association, representing about 2,000,000 acres of land. Finding himself in possession, by inheritance, of some 70,000 acres of sandy land in South Georgia, Mr. Sessoms told how he had discovered that the neglected second-growth (Cuban or slash) pine was capable of yielding a revenue from turpentining, which, under a proper system of management, will yield a perpetual income, sufficient to pay all the expense of taxation and maintenance, and furnish a large surplus for the agricultural development of the remainder. By deep plowing and proper use of fertilizers, the portion brought under cultivation has been made very productive. As a result, not only has he demonstrated to his neighbors that land considered by them as worthless can be farmed, but he has solved the problem of carrying charges, and no longer desires to sell his land in order to get rid of a piece of unprofitable property.

In thus demonstrating on a large scale the possibility of forest crops as a source of permanent revenue, and the fundamental economic solution of the problem of carrying cut-over lands, Mr. Sessoms has done far more for the South than he realizes. The enormous possibilities of the slash pine second growth on the belt of flat, sandy soils bordering the Gulf is not yet appreciated. And in the use of the revenue from this source to develop other portions of his land for crop production, we have a wonderful example of the proper economic relation between agriculture and forestry in this region.

But by far the most hopeful and inspiring phenomenon of this truly remarkable gathering was the candor and honesty with which those southern land owners, mostly lumbermen, discussed the problem of land values and colonization. Not once or twice, but many times, in each of the three days' sessions it was clearly brought out that the settlement and subjugation of these cut-over lands was a difficult and fairly expensive process, and that the owner of these lands was morally bound to see that the purchaser and immigrant succeeded in making a living. Many speakers pointed out the great harm that had been done in every Southern state by the operations of irresponsible land speculators, or unscrupulous land owners, whose only thought was to obtain as high a price as possible for the lands, even though it left the purchaser without capital for their development. It was shown that the cost of clearing, fencing and improvements, and the poverty

and rawness of the soil, requiring two years or more to bring to a condition of profitable production, prevented the actual economic value of these raw lands from reaching a figure much in excess of \$5 per acre. The great injury done to the purchaser, and through him, to the South as a whole, was most clearly and vigorously set forth by such men as Dr. Bradford Knapp, Chief of the Office of Extension Work, States Relations Service, United States Department of Agriculture. Dr. Knapp denounced the process of selling these cut-over lands at high prices to persons unfamiliar with Southern conditions as highway robbery; and he claimed that the advertisements of certain land-selling agencies should be barred from the mails. It is significant that these statements were greeted by prolonged applause from the owners of these millions of acres of cut-over land who composed his audience.

The comparative absence from the deliberations of the convention of participation by the type of professional booster, whose extravagant and optimistic literature is so familiar to the would-be purchaser of lands, was a noticeable feature of the gathering. Representatives of land-selling and colonizing agencies were in attendance and one or two determined efforts were made to stampede the convention into some form of action which would furnish these agencies with advertising capital to be used in booming cut-over lands. But this element never at any time controlled the proceedings or swayed the convention from its purpose, which was to find out the facts, and to map out a plan of organization and policy which sought, not the temporary benefit of the land owner at the cost of misinformed purchasers, but, the permanent upbuilding of stable communities of farmers on such of these lands as have agricultural value.

This convention marks a new era in the economic thought not only of the South but of the entire country,—and in this movement the South bids fair, under the guidance of such men as attended this convention, to take the leadership. This thought was summed up by General L. C. Boyle, of Kansas City, who said: "Not a man to-day has been talking about how much money can be made from a sale of these lands, but of how to help the little fellow. This conference is giving evidence of the right spirit—the unselfish spirit of a vision—the spirit of coöperation. Government coöperation with the people is the order of the day. The men who have the vision, the understanding and the spirit, whether state or national experts, or private land owners, are bound to succeed. The highest patriotism is to make the land habitable for the poor and needy."

A permanent committee of ten men, two from each of the five states represented, was appointed, to perfect plans for permanent organization.

It is worthy of note that a paper prepared by Mr. Henry S. Graves, Chief of the National Forest Service, outlining the possibilities of utilizing much of this cut-over land for second-growth forestry, received close attention, and that the convention adopted a resolution looking to the adoption of plans by which a comprehensive scheme of reforestation may be undertaken, if found practicable.

SOUTH AMERICAN FOREST RESOURCES

A COURSE in Tropical Forestry has been established at the Yale School of Forestry to train men to properly develop the forest resources of tropical countries. There are at least two very large forest regions in the tropics, the Amazon River basin in South America and the Indo-Malay region of Southeastern Asia and adjacent islands. The recent expansion of trade with these regions has focused attention on their forest resources and has shown the urgent need for their proper economic development. This will be greatly aided by the avoidance of the mistakes made in handling the forest resources of temperate regions, which can be done only by the adoption of a suitable forest policy during the early stages of exploitation. What is needed is a public appreciation of the value of the undeveloped resources and of the possibility of making them a permanent asset. This can be brought about by expert foresters, who will not only direct operations in the woods, but also arouse the public to the need of forest conservation, and assist in formulating a proper forest policy, and in the enactment and enforcement of suitable legislation. In India and in the Philippines forest schools have been established to train men for the forest service of those countries. Very little has been done along this line for tropical America, however, so the Yale school's instruction and investigative work will be focused largely on the Amazon country.

A brief review of forest conditions in South America is necessary for a proper appreciation of the problem and

possibilities. The history of every country in the process of development shows that excessive waste accompanies the exploitation of its natural resources. Primitive people of the tropics, by cutting and burning the virgin forest areas to practice a shifting system of agriculture, have been in the past the greatest enemies of tropical forests. The virgin forest areas of the countries of Central America and the West Indies have either been completely destroyed or badly damaged in that way. South America has suffered to a greater or less extent too.

The South American forests, which are of broad-leaved hardwoods, with the exception of two small areas, have been roughly classified under four headings: dry forests, temperate forests, swamp forests, and tropical rain forests, according to the climatic conditions prevailing in the area occupied by each. The dry forests occur in the temperate or subtropical regions, both at high and low levels, over immense areas where the rainfall is deficient or so unevenly distributed throughout the year as to cause long periods of drouth. The tree growth, at its best, is a dense forest of comparatively few species. The trees are short-boled, usually not exceeding fifty feet in height and in many regions averaging little more than twenty-five feet. The commercial stem varies from ten to twenty feet, with diameters of twelve to twenty-four inches common. Perhaps the best known representatives of this type are the Quebracho-Algarroba forests of Northern Argentina.



A "BUTTRESSED" TREE ON THE BANKS OF THE AMAZON

While it is known that the forests of Brazil are rich in valuable hardwoods, they are so vast in extent and the flora so slightly known that botanical investigation will have free scope in this practically unlimited field for many years to come.

tina. They occupy the great semi-arid plain lying between the foothills of the Andes and the Parana and Paraguay Rivers and known as the Great Chaco. Other representatives of the type are the Catinga forests of Brazil and the Coast forests of Colombia and Venezuela between Cartagena and the Island of Trinidad.

The temperate forests are found along the slopes of the Andes where elevation and moisture, combined with suitable soils, make the growth of a temperate forest possible. This type is best developed in Patagonia and comes practically to sea level in Tierra del Fuego. These forests are of Antarctic beech with a few conifers intermixed. Three species of beech would probably furnish ninety per cent of the cut. Although heavy stands are reported in the Patagonian Lake region, the forests are over-mature and so defective as to be of little commercial value. The trees reach heights of one hundred to one hundred twenty-five feet and are two to five feet in diameter. The extension of this type along the Andes from Chili to Colombia can only be estimated. The great populations that have for thousands of years occupied this region drew on these forests for fuel and construction timber and only second-growth or scattered patches remain.

The swamp forests are made up of the typical mangrove area of tidal swamps and the forests of the freshwater swamp and bottom lands. The mangrove areas are

limited in extent and have been partially destroyed, but the fresh-water forests occupy large areas and promise to be of commercial importance in the near future. They are irregular in age, often very open and growth is extremely rapid. The species common in this type are in the main soft-wooded, as soft or softer than our own cottonwood, basswood, or yellow poplar, and many with but little color.

They reach heights of over one hundred feet in the best soils; probably sixty to seventy feet is the average, with diameters of two to three feet common. Certain of these species reach this height in ten to fifteen years and commercial diameters in much the same time. The dominant stand of any given region is generally made up of a very few species. In many cases four or five varieties will furnish seventy-five per cent or more of the commercial timber and will yield eight to ten thousand feet to the acre.

These three types of forest cover the greater part of the continent,



VIEW NEAR USHUAIA, ARGENTINA

The temperate forests of South America extend down into what was once generally known as Patagonia and come practically to sea level in Tierra del Fuego. Here in the far south the trees are rather stunted and deformed by the winds, but in the mountains to the north and along the shore of the Patagonian lakes they reach a splendid development and heavy stands are reported. These forests are of Antarctic beech and a few conifers.

only the northern half of Brazil with small portions of Colombia, Peru, and Bolivia being in the tropical rain forests. Although there are heavy stands of timber in these three immense areas, the supply has been partially exhausted, is too soft for commercial needs, or is overmature, with the result that the limit of consumption is visible. Most of them are in a condition similar to that of the forests of North America and Europe, although not so badly depleted by ruthless exploitation.

There are constantly growing fears that if the present methods of cutting quebracho forests are not modified and measures adopted for their regrowth, there will be little left of them in a very short time. The same is true of greenheart and mahogany, of Spanish cedar and Parana pine, and of other valuable species. Chili produces several varieties of oak of high quality, as well as valuable conifers, but the area is too small to be considered when looking for a timber supply to meet the demands of the world market.

The Amazon basin, which embraces the territory occupied by the tropical rain forests, is contrasted rather sharply with the other timbered areas of the continent, however. While their product may not be able to meet even the local demand, the tropical rain forest areas stand practically untouched by ax or other instrument of destruction. Until recent years, when medical science robbed this tropical wilderness of its most deadly weapons, man has been forced to avoid it. Now, with his newly-gained advantage, he can work his will there and the wealth

supplied by the forests of North America. The woods are, in the main, soft or of medium hardness, and are suitable to replace pine for construction, oak for finish and furniture, hickory for wheels and handles, and ash for agricultural implements. From the standpoint of the lum-



A SAMPLE OF MAHOGANY CUT AT THE SAN PABLO PLANTATION, MEXICO

There are three principal varieties of mahogany trees: the Central American, or true mahogany (*Swietenia mahogani*); the African mahogany (*K. haya senegalensis*), and the Indian mahogany (*Syzgium jambos*). The true mahogany grows in Cuba, Florida Keys, Dominican Republic and Haiti, various islands of the West Indies, Mexico, Central America, and to some extent in Peru and Ecuador.

stored for centuries in the most beautiful and most wonderful forests in the world becomes available for use.

Here are a few facts with regard to the forests of the Amazon basin which show how well able this vast area is to replenish the world's dwindling supply of lumber. One million six hundred thousand square miles of densely wooded land make this the largest forest area in the world. It is three times larger than the forested area of the United States and exceeds by two hundred and sixty thousand square miles that of European and Asiatic Russia combined. The stands run from ten to twenty thousand board feet to the acre and are made up of species practically like those now in use and in most cases better adapted to the uses to which they will be put than those



THE LINGUE TREE

The Lingue tree (*Persea lingue* Nees) is a species of laurel tree which grows between 32° and 41° S. latitude. It is large and its bark is extensively used in tanning hides in Valdivia and neighboring regions. Its wood is very durable, resists decay from water, is beautifully grained and varies from a light yellow to red in color. It is used in making high grade furniture and other cabinet work.

berman, these forests are ideal. The land is level and is crossed by numerous streams, making short hauls to floatable water the rule. Commercial diameters run between two and three feet and clear lengths fifty feet or more. The total height of an average tree is well over one hundred feet. The rapid growth rate of these trees makes the value of the temperate forest shrink into insignificance when compared with the producing power of an equal area of tropical forest. For every dollar of wealth produced by a temperate forest, the tropical forest should yield not less than ten. It is possible to plant and harvest not one but many forest crops in a lifetime with a higher return per acre for each than the single crop of the forester in Europe or the United States. The climate brings forestry nearer to the level of an agricultural crop than anywhere else. Firewood can be grown in from three to five years; pulpwood, posts, and piles in ten to fifteen; and merchantable timber in fifteen to twenty-five years.

It has long been the popular conception that tropical forests are only capable of producing woods chiefly val-

able for cabinet purposes, for dyes and extracts, and for special uses requiring extreme hardness and durability. Crude and costly methods of lumbering have been responsible for the misconception. Under the existing conditions only those woods which met no competition in the market could be handled at a profit. Thorough investigations,



LOGGING IN ECUADOR

It is estimated that the forest area of Ecuador embraces about 376,050 square kilometers, of which 241,662 are of tropical hardwoods; 84,878 square kilometers of subtropical hardwoods; and 49,510 square kilometers of mahogany forests. There is practically no importation of foreign timber into Ecuador, owing to the heavy protection of the home industry. Guayaquil was once famous as a shipbuilding center and exporter of lumber, and efforts are being made by the Government to revive the lumber industry and to develop the splendid resources of the country's forestal wealth.

which have been made recently, conclusively show that modern methods of logging will reverse that unusual condition and woods which it has been cheaper to import from countries thousands of miles away will be replaced by native woods of superior quality and at a cheaper price.

The world needs vast quantities of wood, and no spot on the earth with abundant forest wealth is too remote to prevent a profitable harvesting of the timber crops. Quantity of the product, coupled with size and quality, are the only factors determining or limiting the degree of utilization. With the Amazon basin to draw on, South America has the wonderful opportunity of becoming the center of the world's lumber industry. If the various governments will organize forest services and train their young men as foresters, the wealth of this region will flow into their treasuries. South America's future and many of the great problems of forest administration in Europe and North America depend on how this forest is treated. If it is destroyed, as the forests of Argentina, Paraguay, and southern Brazil are being destroyed, it will mean economic ruin, probably also absolute physical ruin, to land, climate, property, and life on a great part of the southern continent. If, on the other hand, it is protected and properly utilized, South America becomes the center of the world's prosperity in the years to come. The saving of this forest also

means that Europe and North America will have time to repair their damaged forests, to perfect their organization, so as to meet the demands without destroying the capital. Only by obtaining great supplies from these virgin forests of South America can this crucial time in the great struggle for forest conservation be safely passed.

The Yale Forest School is doing the world a service in establishing courses that will make it possible for students from foreign countries to get an education in the kind of forestry they will be called upon to practice. Upon graduation such men can return to their own countries and be the leaders in the forestry movement there. They can carry on propaganda work that will aid in educating the public to the need of a strong forest conservation policy. They will be equipped to organize forestry departments to



THE JEQUITIBA TREE OF BRAZIL

This magnificent giant of the Brazilian forests, known as the jequitiba branco (*Couratari speciosa*), often attains a diameter of 5 to 7 meters and a height of over 30 meters. It is said that instances are known where the trunk of a single tree produced more than 8 metric tons of wood. The wood, which is of whitish color, is soft and very light, and is extensively used in making boxes, cases and crates, and as a substitute for pine.

carry out the policy when adopted. They will urge the establishment of forest schools in connection with the government or universities so that, as the forestry movement grows, the country will be in a position to train its own foresters. They will be trained to do investigative work. The courses in lumbering will acquaint them with the modern methods which must be applied. In short, they will be equipped to establish the forests on the ideal basis—one of permanent, maximum yield.

[EDITOR'S NOTE.—Most of the information and many complete statements in this article are taken from articles by Dr. H. N. White, Assistant Professor of Tropical Forestry at Yale University, Mr. H. M. Curran, Special Lecturer on South American Forests at Yale, and Mr. Raphael Zon, Chief of Forest Investigations of the United States Forest Service, and the photographs are from the Pan American Union.]

HARMONIZING LUMBERING AND ESTHETICS

BY C. M. GRANGER

AGREAT many lovers of the outdoors feel that Nature's forests should be left undisturbed by the ax to furnish a constant source of delight by their very wildness. The Forest Service receives many requests to preserve from cutting National Forest timber near some mountain summer retreat or along some travelled highway. Occasionally the petition comes from some old resident who has lived with his little patch of trees so long that he actually knows the majority of them as friends and would sorely miss one single individual from the grove. Only a short time ago a request was received from the Rotary Club of Pueblo, Colorado, that the timber along a projected automobile road through the Greenhorn Mountains, which constitute Pueblo's outdoor playground, be withheld from sale and cutting to preserve the scenic attractions of the region.

On the other side of this question we naturally find the lumberman, who believes, as a general rule, that all the timber which is big enough for sawlogs should be cut. In many cases he is compelled to strip his own land because the excessive taxes and interest charges make it financially ruinous for him to delay cutting or to leave the immature trees to be cut later. As a result, countless areas have been stripped of their timber, leaving nothing but a mass of tops and branches and a few scattered trees too small or worthless for cutting. Many times fires have run through these slashings, completing the devastation; but whether fire comes or not the cut-over land presents a most unsightly appearance. The ideal condition in forest management is use without abuse, safeguarding the esthetic values while utilizing the mature timber crop, and this is common ground on which both the preservationist and the lumberman can stand.

The National Forests, including virtually all of the

mountain areas of the West, contain all manner of wonderful scenery—rock, water, and trees in every conceivable combination. Because the Government sells the ripe timber on the Forests, the fear has been entertained that the wild beauty of the forests will in time be changed through removal of the timber. Let us see what a closer view of the situation reveals.

The timber bodies on the National Forests may be divided into commercial and non-commercial stands. The former are made up of trees of value for manufacture into lumber and other wood products and so located that they may be profitably logged. The non-commercial stands, on the other hand, are those which, either by reason of the quality of the timber or its inaccessible location, are not suitable for lumbering. The timber stand or individual tree has its greatest scenic value when combined with other natural features of picturesque character—deep canyons with rocky walls, high, rocky cliffs, mountain lakes, and the like. In such locations logging is usually out of the question because of the rough, rocky ground, or because the timber is not dense enough or of proper quality to make lumbering pay. Here, then, at any rate, the forest primeval will reign undisturbed by man to create its scenic and esthetic values in Nature's own way.

There are countless areas of these non-commercial forests in every National Forest, both mixed with the commercial timber stands and in the higher rougher portions of the mountains. Those bodies of timber just below upper timber line are the most conspicuous examples—in which many of the trees, because of exposure to severe storms and cold, become possessed of queer, twisted forms, or grow only into dwarf trees of an unusually picturesque character. Due to the location of such timber bodies at the very heads of the streams, they



STAND AFTER A CUTTING

One-third of the timber on this area has been cut under a National Forest timber sale, and there remains a thrifty stand all the better in health and appearance for the cutting of the mature and decadent trees.

have a most important function in protecting and regulating streamflow; and because of this and the fact that cutting is impracticable on account of the quality of the timber, such forests are termed "protection forests" and are held intact. Taking Colorado as an example, almost one-fifth of the timbered area in the National Forests



NO SIGN OF CUTTING HERE

When the brush is burned after a timber cutting there is little to show that there was any cutting.

lies within the protection stands at the higher altitudes; and by adding to this the areas lower down in the commercial stands which are too rough to permit logging, it is safe to say that at the very least one-fourth or one-third of the forested areas, and the most picturesque, will never be encroached upon by the axman.

Aside from the fact that most of the timber on the more scenically important parts of the National Forests is through its non-commercial character, in no danger from the lumberman, Uncle Sam is going to see that unusual scenic features and recreation possibilities may be of the highest service to their owners—the people—by being kept and developed primarily for their recreation values. For example, the city of Denver has acquired a considerable acreage of foothill timbered land west of the city, which is being rapidly developed as Denver's Mountain Park. Excellent roads are being built, camping sites with permanent fireplaces established, shelters erected, and other improvements made to bring out and make usable the recreation opportunities. Thousands of people from Denver and elsewhere motor through this park every fair Sunday and holiday. Alongside this park area is a tract of land within the Pike National Forest which has the same general characteristics and is visited and enjoyed in conjunction with the city's lands. It is the aim of the Forest Service to administer this area primarily for the development of its recreation values, since it can serve its most important use in that way. There is a working arrangement with the city officials

whereby any timber sales applied for will be considered first as to their possible effect on the scenic values of the region. If the timber is well away from the roads, where its cutting could not detract from the esthetic values, the sale will be made; but if travelled roads cross or go near the area, or if it is of special scenic importance, the timber will be preserved intact.

On such areas, so intensively used for recreation, many of the mature trees, if not deformed or defective, which would be cut in an ordinary sale, have a picturesque character which adds materially to the beauty of the region, and their retention as "scenery" is felt to be fully warranted. Similarly, along important scenic automobile highways which traverse the National Forests, the same rule would be applied to a strip of timber on either side of



TOURISTS IN THE PIKE NATIONAL FOREST, COLORADO

These tourists are in North Cheyenne Canon on a holiday trip. Note the ragged tree with dead limbs at the roadside. If this were removed the remaining forest growth would be more attractive. Timber sale cuttings would do just this.

the road, so that the forest may play its part to the fullest extent in making the route attractive. Either the natural protection, or that which is afforded by the policy of the Forest Service, will, then, take care of the great bulk of the timber part of the most important National Forest scenery. Possibly a brief discussion of the way in which the National Forest timber is cut will serve to show that little inroad is ordinarily made on the scenic feature even in the commercial stands.

Many of the forests of the Northwest have such a dense undergrowth of shrubs and vines that one may

travel only on hewed-out trails. To a somewhat lesser degree the same conditions are found in the Engelmann spruce forests of the Rocky Mountains. Here, in many places where the timber is very much over-ripe, great numbers of the overmature trees have become decayed and have fallen, mingling in a mass through which a horse cannot go at all, and where a pedestrian's progress is only a combination of crawling, squirming, and climbing. Such forests are just as scenic as any other when viewed from a distance, for in a bird's-eye view timber is just timber; but to get the true and greatest enjoyment out of the forests one really must get into them, not only on travelled roads and trails, but along the byways where there is nothing to guide but one's inclination. To the writer there is no outdoor experience more enjoyable than rambling about through a stand of big trees under which the

forest floor is a carpet of needles clear of fallen trees and other evidences of decay. Those familiar with Western yellow pine timber know what this condition is, and the same is true, with of course far more impressiveness, of many of the stands of big trees (*Sequoia*) in California.

If left to itself the forest will grow up and grow old, have its youthful and old-age diseases, and become crippled and infirm, just like a human being. At the outset a young forest is made up of thrifty little trees, each striving to grow into a big tree, and each fighting for its share of light and moisture. There are usually more trees on the ground than there is soil moisture for, and they are so crowded that each one cannot get all the light it needs, so the law of the survival of the fittest comes into play, and the less sturdy members drop behind in growth, are overtapped and starved for moisture, and eventually die or become merely struggling stunted specimens. The stronger trees continue to grow into a full stand, but they are not immune from attack by disease and insects, and many of them become the victims of fungus diseases, mistletoe, and insects, which sometimes kill them, while others are merely deformed. It is when the trees reach maturity, when growth virtually stops, and become really "old," that they are the most susceptible, either through disease which has previously attacked them, or because they have not the vigor of youth to combat attacks, and large numbers of them develop spike tops or "stagheadedness," where the top dies back several feet, or the top is

broken off, or forked trees split and lose one fork, or otherwise show some prominent sign of infirmity. If attacked by insects the whole tree may die, standing for a few years, and then falling down. The usual mature forests, then, is made up of a mixture of thrifty and infirm trees. Added to the crippled green trees are dead ones, both standing and fallen.

Under the law which authorizes the sale of timber from the National Forests, the primary object of a sale must be to preserve "the living and growing timber and promote the younger growth." The men who manage the National Forests have worked out plans under which the greatest benefit will accrue to the stands of timber through judicious cuttings. Before any living tree is cut it must be designated by a Forest officer. The officers who do the marking go through the stand, selecting



SCENIC VALUE NOT TO BE DESTROYED
Around lakes visited as recreation areas no cutting would be allowed in a strip of timber around the lake and deep enough to insure no detraction from the natural beauty of the place.

for cutting those trees which are mature or overmature, and those immature ones which are in some respects defective or which need to be removed to thin crowded groups so that those left in the group may have room to grow and develop properly. All the young and middle-aged trees which are sound and thrifty are left, and they will greatly increase in size and value before the next cuttings on that area. After the cutting under these marking principles the remaining stand is free of the "spike-tops" and other cripples, and presents a thrifty appearance far more pleasing to the eye of many than the "unbarbered" stand. Furthermore—and this is a vitally important thing—the removal of the diseased overmature trees has eliminated a vast amount of fungus disease, and materially decreased the opportunity for infection of healthy trees, so that the stand has not only been put in much healthier condition, but it has much better chances of remaining healthy.

Under the marking system which has been outlined the cutting is in every sense a moderate one. For example, on a large tie sale in lodgepole pine timber on the Medicine Bow National Forest in southern Wyoming a sample area was marked to show the purchaser how the marking principles would be applied. On the area covered by the sample marking there were on the average 347 trees per acre which were six inches and more in diameter four and a half feet above the ground, and of these only fifty, or less than 15 per cent, were marked for cutting, leaving

almost two trees for every square rod. On this same area the marking took only 37 per cent of the trees 10 inches and over in diameter at breast height. At the same time all the trees which had reached a sufficient size to be mature for cutting as tie trees were marked, and the lumbermen got the ripe crop, while the unripe timber was left, having both its future commercial and present esthetic values intact. When the stand is ready for cutting again, and at each succeeding cutting, the same marking principles will be applied, but the second cutting will be done when the trees now middleaged reach maturity, and before they become overmature and infirm, so that there will never again be the large number of defective trees in the stand there were in its virgin condition; and both commercial and esthetic values will always be at the maximum.

Forest Service sale contracts specify that stumps must be cut low to secure the fullest possible utilization of the tree, and that all the brush and other débris resulting from the cutting must be disposed of in a specified manner.

The limbs are trimmed off the unused portion of the trunk and wherever the fire danger is great they are piled and burned; while in localities of small fire danger the brush is frequently scattered out in a thin mat so that it will decay rapidly and disappear. Thus, with the low stumps, and after the brush has been disposed of, the ground on which cutting has been done shows little evidence of the cutting, and one going through the cut-over stand on snow deep enough to hide the stumps would ordinarily never realize that any cutting had occurred. Under the usual marking systems employed in National Forest timber sales, then, the permanence of the forest is assured.

With Uncle Sam spending hundreds of thousands of dollars every year on good roads and trails to make the National Forests more accessible to the public for recreation—and they are coming to be more and more the nation's playgrounds—the people can rest secure in the knowledge that he is going to bring lumbering and esthetics together so that each shall occupy its logical place.

PINE BLISTER DISEASE QUARANTINES

A QUARANTINE against the shipment of white pine seedlings west of Minnesota, Iowa, Missouri, Arkansas and Louisiana and including these states was recently ordered by the Federal Horticultural Board of the Department of Agriculture. This action followed the passage of the amendment to the quarantine law giving the Board increased power and the hearing on the quarantine proposition on April 10 at Washington. The further importation of currant and gooseberry bushes from Europe and Asia on which the white pine blister disease may be carried is also prohibited. A supplementary order of the Horticultural Board prohibits the shipment of five-leaved pines or black currant bushes from the heavily infected region comprising the New England states and New York to any point outside. This additional quarantine is made for the purpose of protecting other quarantined states as well as the remainder of the country from possible infection.

The quarantine was first made effective on June 1, but the Board later, learning there was a considerable movement under way of possibly infected white pines and to a less extent black currants from New England to states lying west and south, amended the original quarantine covering that section and made it effective May 1.

The Board explains that the quarantine was first made effective June 1 because: "the fixing of the effective date of these quarantines at June 1 was done solely in the interest of the nurserymen in recognition of their needs and of their spring contracts for delivery."

And adds: "It is hardly necessary perhaps to say that the Board will expect nurserymen, in return, to scrupulously respect state quarantines in relation to the pines, currants and gooseberries covered in these orders, and it is understood that in the meantime the voluntary agreement of a year or more ago not to ship any white

pines or currants or gooseberry plants into the Rocky Mountains or Pacific Slope states is to remain in full force and effect. The inspectors of these western states have been notified of this understanding."

These quarantines, together with the \$300,000 appropriation made by Congress for the suppression of the pine blister disease, follow the widespread public agitation of last fall and early this year, lead by the American Forestry Association, to secure national and state action against the disease which threatens to wipe out white and other five-leaved pines of this country and Canada valued at over \$500,000,000.

The various states have taken action, to date, as follows, the quarantines, unless otherwise specified, being against pines, currants and gooseberries:

California—Quarantine against all five-leaved pines and currants and gooseberries from points in the United States east of the Mississippi.

Delaware—Quarantine against all points outside the state.

Idaho—Quarantine against New Hampshire, Vermont, Massachusetts, Connecticut, New York and Pennsylvania.

Indiana—Quarantine against all points outside the state.

Kansas—Quarantine against all points outside the state.

Massachusetts—Quarantine against white pines from Europe, and an appropriation of \$50,000.

Michigan—Quarantine against all points outside the state.

Minnesota—Quarantine against all five-leaved pines in New England, New York, New Jersey, Pennsylvania, Ohio and Wisconsin and an appropriation of \$15,000.

Montana—Quarantine against New Hampshire, Vermont, Massachusetts, Connecticut, New York and Pennsylvania.

Nevada—Quarantine against territory east of the Mississippi, Minnesota and all foreign countries.

New Jersey—Quarantine against five-leaved pines from all New England, Pennsylvania, New York, Minnesota and Wisconsin.

New York—Quarantine against five-leaved pines from New England, Ohio, Indiana, Minnesota, Wisconsin, Pennsylvania, Illinois and New Jersey; and an appropriation of \$15,000 as well as \$10,000 already given for suppression. Also black currants are declared to be a public nuisance, are to be eradicated and all necessary state quarantines enforced by the state authorities.

Ohio—Quarantine against five-leaved pines from all points outside the state.

Oregon—Quarantine against territory east of the Mississippi and all foreign countries.

Pennsylvania—Quarantine against all five-leaved pines from points outside the state. The appropriation bill is still in the legislature.

South Dakota—Quarantine against all points outside the state.

West Virginia—Quarantine against all points outside the state.

Wisconsin—Quarantine against five-leaved pines from points outside the state.

Nebraska—The State Entomologist is authorized to declare a full quarantine.

Maine—Appropriation of \$5,000 for 1917, \$5,000 for 1918 and power to destroy pines, currants and gooseberries, to fix a compensation and to quarantine.

Vermont—Appropriation of \$25,000 to include campaign against gypsy moth and other plant insect and disease control work.

New Hampshire—Appropriation of \$28,000; the state forester is given power to destroy pines, currants and gooseberries except in nurseries, and the state nursery inspector has quarantine power.

Rhode Island—An appropriation of \$25,000.

Connecticut—An annual appropriation of \$7,500 and \$5,000 extra for use during the currant season.

Virginia, North Carolina, South Carolina and Maryland are now considering stricter quarantine measures to keep out the disease.

A NECESSARY QUARANTINE LAW

ARICULTURE has long suffered unwarrantably from pests—the alfalfa weevil, the boll weevil, the grape phylloxera, for instance.

"This is especially true of that great department of agriculture, the Forest Service—a service which embraces privately-owned as well as publicly-owned forests. They have had to face the onslaught of the brown-tail moth, the chestnut blight, and now the pine blister rust, which threatens the white pines of the United States and Canada, valued at over \$350,000,000. The only way to control the disease seems to be to eradicate in the neighborhood of white pines the currant and gooseberry bushes, both wild and cultivated, on which the rust propagates and spreads to the pines, and to institute strict quarantine laws.

"The pine blister rust has not heretofore been widely prevalent in America. It now exists in the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Wisconsin, and Minnesota. Hence it is necessary to quarantine these states, together with portions of other states, prohibiting the movement from them to other states of five-leaved pine nursery stock and of currant and gooseberry stock. In addition, the movement of this stock from the most seriously infected states (the New England states and New York) to the less seriously infected states should also be prohibited, as should be the importation of all currant and gooseberry plants from Europe and Asia.

"It is a satisfaction to know that these three things are now being done, and that our Government can follow the examples of Germany, Austria, France, Holland, and Switzerland in enforcing quarantines. Among the measures passed by the Sixty-fourth Congress the new Quarantine Law has escaped general notice, perhaps because it was passed on Sunday, March 4, just before adjournment. It is one of two amendments to the Agricultural Appropriation Bill, added because of the urgent plea made by the American Forestry Association. The first of these amendments appropriated \$300,000 for the investigation and eradication of the pine blister rust. The second gave to the Federal Horticultural Board of the Department of Agriculture authority to declare effective quarantines against tree and plant diseases. Existing law permitted the Board to declare a quarantine only where a dangerous plant or insect infestation was known to exist. Of course such quarantine was manifestly inadequate. The Board needed the power to declare a quarantine wherever quarantine should be necessary to prevent the spread of the infestation.

"All lovers of the forest and all who are interested in forestry in any way will be relieved to know that at last our Government has the power to deal effectively with disease, and has taken three necessary measures to that end."—From the *Outlook*, April 16.

YE GOOSEBERRYES

IF the fight which is being launched this year to save the white pine forests from destruction by the pine blister rust proves successful, gooseberry jam will be a rarity. In a curious old manuscript of the 17th century, *Recettes Medicales d'autrefois à Jersey*, we are told how our forefathers made "gouseberry custard":

"Take a posnet and put in a little rose water, put in gouseberryes as many as you thinke fitt, then put them into the posnet and boyle them till they be boyled to peaces, then take them up and beate to yealkes of eggs and put them in ye gouseberryes, then put it into a platten, and then put sippetts into the platten but you must first of all sweeten it very well."

AWOOD specimen found in glacial drift and estimated by the Wisconsin State geologist to be approximately half a million years old has been identified by the Forest Products Laboratory of the Forest Service as spruce.

EDITORIAL

CUT-OVER LANDS A NATIONAL PROBLEM

NO nation, with the possible exception of Russia, in Siberia, has ever become possessed of such an enormous area of land capable of agricultural development as the United States. In the Colonial period, the energy of our mixed but largely English stock, confined by the barrier of the Appalachians, and by the ferocity of the Iroquois tribes in western New York, expended itself upon the crowded and not very fertile soils of New England and the Atlantic seacoast. The extent of this clearing greatly exceeded the limits of normal development, and visitors in New England are frequently amazed at the evidences of past cultivation of barren hillsides and rocky thin-soiled pastures.

With the bursting of the great Appalachian dam, about the time of the Revolutionary War, this flood of pent-up energy flowed westward, first clearing the fertile wooded soils of the "Northwest territory," and the more mixed and spotty areas of the South,—then, with increasing force, deluged the prairies of Illinois, Iowa, and the Great Plains, where the settler no longer had to clear his land of stumps and forest growth. The gold rush of '49 carried the wave of settlement to the Coast, while the backwash from this wave filled the interior basins.

This great westward movement took the cream of the public lands—those most easily cleared, most fertile, and best located. Then came a further great absorption, this time of public timber lands, accompanied by the building up of large units of ownership through the assembling of smaller tracts, so that the business of lumbering might be profitably and economically conducted.

About the time that lumbering, conducted on a gigantic scale in the Lake States, began to reach a stage of exhaustion, and the area of cut-over lands had mounted to large figures, the available fertile and watered public lands of the country had been almost completely absorbed. Immense areas remained, but these were too mountainous or too dry to be farmed under the Homestead Law. About this time, too, many farmers' sons in the richer sections, and others from overcrowded cities, began to seek a foothold on the soil.

This pressure created a market for cut-over lands. Up to this time, the Lake States lumbermen had abandoned large areas after removing the timber, rather than pay taxes. It was natural that they should seize the opportunity to realize something from the sale of this cut-over land,—and a second era was ushered in by the advent of the land speculator, who bought up large tracts at very low prices, often realizing several hundred per cent by selling to customers at from \$5 to \$10 per acre.

But the clearing of a farm from either timber or cut-over land is pioneer work, requiring years of hard physical toil, or else the expenditure of considerable capital to make headway in removing stumps and bringing the raw soil under the plow. Buildings must be erected, the land must

be fenced, agricultural machinery and livestock acquired, and the roughness of the soil subdued to permit proper cultivation. Studies made of clearing land show that the actual costs of removing brush and stumps and breaking the soil will reach figures that in some parts of the Pacific Northwest are prohibitive. When added to this we include the cost per acre of the fencing, building and other capital, and the cost of living during the period when the farm is being brought under cultivation, we are faced with the fact that *the true economic value of cut-over and unimproved lands is very low as compared with these same lands after this investment has been made.*

The pioneer on government land incurred no cost but his filing fees and his labor. A great item in reducing his living expenses was the plentiful supply of wild game in these new regions. Coming of rugged stock inured to hardships, with simple wants, he usually succeeded in subduing the forest and carving out a farm. The modern pioneer is confronted at the outset with an expense of purchasing his land. Too often he is city bred, ignorant of farming as a profession, unable to do without many of the modern luxuries, and soon discouraged both by the unwonted hardships encountered, and by the comparative loneliness of life on a new farm. But even if he comes of good farming stock, or from the hardy races of immigrant peasantry of Europe, he has to face the three handicaps not known to our fathers, the first cost of soil, the absence of wild game (or restrictive game laws) and the comparative poverty of the soil. For all will admit that the richer soils were the first cleared and settled. Is it any wonder that the saying is current that it takes three crops of settlers to subdue a farm in the wooded sections? The final owner builds his success upon the ruined hopes and wrecked investments of his less fortunate predecessors.

The area of cut-over lands in America is enormous, and is increasing every day. What is going to be done with these lands? Are they to remain a wilderness, scorched and blackened by repeated fires, on which not even a second growth of timber can succeed in establishing itself? Or, worse—are these lands to remain as an enormous sponge, in the hands of land speculators, who by playing upon the credulity and eagerness of land-hungry purchasers, and by charging many times the intrinsic value of the lands, deprive them of their entire store of savings and leave them a mortgage in place of the capital absolutely required for farm development? When the victim fails to meet his interest, the sponge is squeezed dry, the purchaser evicted and the land is again on the market to soak up more savings.

The time was in this country when any method of making money, not prohibited by law, was considered legitimate, and the operations of dealers in cut-over lands were regarded as beneficial to a community by bringing in





new people to spend money in the neighborhood. But of late there has been a tremendous awakening, North, South, East and even in the far West, the land of the booster and the optimist. America is tolerant of wrong, but only up to a certain point. Bitter experience has recently taught many communities—even entire states—that a defrauded purchaser and an immigrant who fails does tremendous harm to the reputation and fair name of the region. Associations of land dealers have even been forced in self-defense to abandon their methods of flamboyant advertising and employ experts to determine cold, hard facts as to the value of the lands they were endeavoring to sell,—and this because sales had become impossible, due to the bad name fastened upon the region through avarice and irresponsible speculation.

For the first time, too, the various state and governmental agencies seem to have become aroused to the need of a vigorous exposition of facts, and to have lost their fear of incurring the displeasure of entire communities acting under the leadership of these land-selling interests.

The fight for an equitable policy in the sale and settlement of raw lands, a policy which demands that the value of these lands shall be placed at its true figure instead of being inflated, is by no means won. But if many more

such conferences as the Cut-over Land Conference recently held in New Orleans are brought about, we may hope for great things in the near future. The Conference passed, among others, the following resolution: "*Be it further resolved*, that inasmuch as many acres of this area are better adapted for forest growth than for agricultural crops, the Association shall undertake to further and promote the development of approved forestry methods, looking toward reforestation of such areas, for the benefit of future generations, and where practicable to combine such reforestation methods with livestock development."

The day of the pioneer is not gone in America—we need him more than ever to help bring under cultivation the enormous areas of cut-over land suitable for agriculture. Let us do him economic justice, and give him at least as favorable an opportunity to make good as our forefathers had, and cease our efforts to deceive him into thinking that cut-over lands are worth just as much in their raw state as they will be after he has put into them all he has, his capital, and his life blood. We wish success to the high-minded and patriotic stand taken by those Southern lumbermen, owners of 76,000,000 acres of cut-over land, who have pledged themselves to the policy of fair dealing with the settler, regardless of immediate profit to themselves.

SHALL THE NATIONAL FORESTS BE MADE SELF-SUPPORTING?

WHEN the National Forests were first placed under efficient administration it was the expressed hope and intention of the United States Forester to make them self-supporting within five years.

But with the development of the work, the magnitude of the task of protecting, developing and administering some 160,000,000 acres of wild and inaccessible land became better understood and the appropriations for these purposes still exceed the income by over \$2,000,000. In 1916 the income from the forests totalled \$2,800,000, which is three-fourths of the sum required to protect and administer them, the remainder being spent for permanent improvements, and for forest investigations. Receipts are constantly increasing, the income for 1916 being greater by \$340,000 than for the previous year.

Until recently, Congress was somewhat inclined to criticize the Forest Service for its apparent failure to establish the National Forests on a self-supporting basis within the stipulated five-year period. Enemies of the national policy have cited the excess of expenses over income as a proof of extravagance and failure of the whole program. But of late a distinct reversal of attitude is noticeable, and the Service has apparently justified its policy beyond further question.

The principal cause of this change of heart is the fact that the leaders of Congress have become practically convinced that the administration of the National Forests is economical and efficient. A cost of less than $2\frac{1}{2}$ cents per acre per year for all purposes directly connected with protection and management is not an extravagant sum to pay for the character of service secured.

The two principal sources of income are fees charged for grazing livestock and receipts from the sale of timber. If the forests are to become self-supporting it must be mainly

from the utilization of these two resources. In either case, *the income received cannot be made the primary consideration*, yet the Government must obtain from the sale of these resources what they are actually worth on a competitive basis, otherwise an unfair commercial privilege is received by the successful applicant, which reacts injuriously on his immediate competitors and upon the public, which would lose the revenue, their only return in lieu of taxes which would be paid were these lands privately owned.

For a long time the fees charged for the grazing privileges were too low. But as soon as steps were taken to correct this injustice, those stockmen who then held the grazing privileges protested that the present income from grazing was more than sufficient to pay the cost of administration, and therefore the fees should not be increased! This was the old doctrine of self-support, but with a decidedly new application! When the grazing fees have been fully adjusted—which has not yet been accomplished—the revenue from this source alone will total over \$2,000,000.

In seeking to apply the same principle of charging the true value of the resource to the sale of timber stumps the Forest Service has had a problem which has called forth its best efforts—not only for the fixing of the proper price of stumps, but in deciding upon the quantity which should be sold. If the sole object of the Service had been to increase the income in order to make a showing for Congress, they could have done so by offering large bodies of timber at reduced prices (thus approaching the old policy by which four-fifths of our timber was sold or given away for a few cents a thousand feet under our land laws). But against such a policy stood the principle that timber resources must bring in the actual ap-

praised value of the stumpage—and this principle has been strictly adhered to at all times. In fact, the foresters employed by the Service have developed timber appraisals to a science which in thoroughness and accuracy exceeds anything previously attempted by private corporations.

Even with this check upon excessive sales of timber, opposition is still strong in some quarters against *any sales of national forest timber whatever*. This is especially true in regions like Washington, Oregon and Idaho, where there is an overproduction of lumber. It reaches an acute stage when the Service appraisals show stumpage values less than those desired or expected by the owners of small tracts of private timberlands acquired under the homestead, or stone and timber laws. There is much excusable ignorance of the factors which determine stumpage values on the part of such land owners. The prices paid for stumpage do not in any case determine the price of lumber,—but on the contrary, the lumber prices, less the cost of manufacture, transportation and logging, are the only ultimate basis for the value of the stumpage. Stumpage prices cannot be regulated by law. It has been pro-

posed—for the benefit of timber owners—to set a minimum price upon National Forest timber. The only effect of such a law would be to prevent the sale of such timber at all, except where it was actually worth more than the price set. It would not serve to increase values.

Whatever is the outcome of these conflicting economic factors, one thing is certain—that the income from the National Forests must be based upon other considerations than those of profit and loss on the administration. What other department of the Government is placed upon this basis? Are we to eliminate the educational activities and experimental research of the Service because it is not productive of immediate revenue? And what value shall we place upon the protection afforded to watersheds and irrigation throughout the west, or upon the recreational and scenic features of the forests, which require an expensive system of fire protection?

The National Forests may become self-supporting, and even produce a surplus income. We do not care how soon this occurs, nor should we tolerate the sacrifice of a single economic principle or public benefit to attain such a result.

A VICTORY FOR EFFICIENCY AND ECONOMY

THE Minnesota Forest Service, since its establishment in 1911 by the employment of a trained forester, has been a model for other states. The ideals sought by this law were complete freedom from political influence, the appointment of all agents strictly on a basis of merit, and the enforcement of regulatory police powers to secure fire protection, without fear or favor, against both the rich and influential, and the man of smaller means and less responsibility.

These objects have been completely attained, by the continuance of the Minnesota State Forestry Board of nine members, with power to appoint and to protect their own executive agent, the State Forester.

But the movement for efficiency and economy, initiated in Minnesota four years ago, and gaining great headway, with practically no real opposition, suddenly developed into a sinister attack upon the integrity of this State Forest Service. The so-called Public Domain Bill, which sought to effect a great consolidation of the departments of lands, forestry, immigration, highways, fish and game, drainage, waterpower, and mines, under a single all-powerful commissioner, who should appoint subordinates over various of these departments, included a provision abolishing both the State Forestry Board and the State Forester's office. The independence and integrity of the forestry department was to be completely destroyed by creating a new department of lands, forestry and immigration, under a political subordinate, who in turn would have control of an official of third rank charged with the former duties of State Forester.

Whether this plan was deliberate, or arose from the inability of politicians as a class to grasp the essential principles of efficiency in state work, the effect of such a measure, if passed, would obviously have been to put an end to the effective enforcement of the law requiring log-

gers to burn their slash, and to throw the entire machinery of state forestry back into the morass of patronage and party politics. Against such a result the American Forestry Association lodged a vigorous protest.

Partly through the Association's efforts exerted along educational lines in calling the attention of the people of the state to this situation, and partly because of vital defects in the bill itself, which not only failed to secure economy but threatened to destroy certain essential safeguards now in force in the methods of handling public property of immense value, this imprudent and dangerous measure was finally defeated, not once, but twice—for after the first defeat in the State Senate, a duplicate bill passed the House, only to be again consigned to oblivion in the Senate.

It was freely claimed that this bill would create a vast political patronage—a part of which would have been represented by the field force of the State Forest Service, deprived of their directing head, the State Forester, and subjected to the influence of the party in power. For the present, this movement to capture the State Forestry Department has been definitely side-tracked. But the people of Minnesota may not yet realize that under the cloak of efficiency and economy, the effort to reduce all state departments to a system dependent upon influence and partisan politics, will surely be continued. There is much to be learned by our states if they ever expect to attain a really efficient and economical administration of their internal affairs—and it is time that the people as a whole came to a better understanding of the need for skilled services and merit in the management of state departments requiring technical direction. They would then be less apt to swallow the sugar-coated pill of consolidation whose apparent purpose is to improve the state machinery, but whose effect is often to tear down its most efficient units.

A GROUP OF LOW-COST COUNTRY HOUSES

BY RAWSON WOODMAN HADDON

IN any consideration of the small and inexpensive country house it is well to remember at the very start that, to the architect, far less ingenuity need be brought to bear upon the work at hand in the designing of a very large and expensive building where whatever economies that are practised are the result of choice and not of necessity, or in a very cheap house, where all but the main essentials are necessarily eliminated, than is the case with the house of moderate cost in which it is desirable to embody with good design not only convenience and comfort but rigid economy as well.

And the time spent, therefore, in the designing of a low-cost house, that is, of the type costing less than five or six thousand dollars, is quite as great as the time necessary to design one costing from five to twelve or fifteen thousand dollars.

For this reason it is perhaps a natural result that small houses are seldom designed by architects of anything like national reputation, or, as a matter of fact, by any architect at all, excepting, too often, by men who attempt that impossible combination of which we so often hear, the "architect and builder."

An exception to this general rule is found in a group of houses recently built on Indian Hill, Worcester, Massachusetts, under the supervision of Mr. Grosvenor Atterbury, of New York City. Mr. Atterbury's work at Forest Hills, Long Island, and his connection with many such large town planning developments is well known.

Among the various suburban developments that have been undertaken during recent years none surpass—while few, indeed, even equal in interest—this work which was

recently undertaken by the Norton Company of Worcester, on Indian Hill, a large tract of some hundred and fifteen acres or more of undeveloped land near that city. The development was undertaken in the interest of three thousand seven hundred or so various employees in the company's factories nearby.

While various developments of a similar kind, some larger and some smaller, have been undertaken in Europe that are very nearly perfect from the point of view of good architecture and good town-planning, it is, nevertheless, a lamentable fact that the few developments found in America until the immediately recent years have been, without exception, most noticeably lacking in any qualities of good, substantial design,

General view of Indian Hill, Worcester, Massachusetts, from across the Lake, showing the first houses erected.

and in any suggestion, however slight, of rational landscape or town-planning.

For the reason, then, that the Indian Hill development contains within itself all these desirable characteristics, both in the houses separately and as a development as a whole, and because the actual work, while praiseworthy in design, is at the same time economical in construction, this development marks a most important period, just as Forest Hills has done, in the history of matters of this sort in the United States.

The pest of the poorly arranged and often wholly uncomfortable as well as unsanitary dwelling that is too often found in large suburbs where even much more expensive houses are erected is by no means confined to any one section of the country or to any one class of dwelling, and for this reason whatever results may have been obtained in any development, large or small, are equally of interest to the individual



DEVELOPING A BUILDING SITE

General view of Indian Hill, Worcester, Massachusetts, from across the Lake, showing the first houses erected.



AN IDEAL STREET

General view showing typical street of delightful suburban settlement. Grosvenor Atterbury, architect and town-planner.

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Grosvenor Atterbury, Architect
WORKINGMAN'S COTTAGE
Indian Hill, Worcester, Massachusetts.

owner who is planning to build a single low-cost home of his own, or to those who are opening up large tracts of land upon which many suburban homes are to be built, either as industrial or everyday suburban real estate developments.

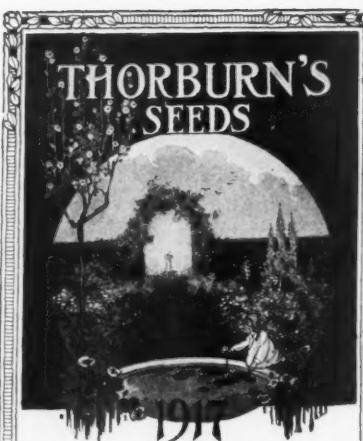
It was not so very long ago that building market conditions were in such shape that to design a house costing not more than three thousand dollars was comparatively simple. At the present time conditions are such that to duplicate a three-thousand-dollar house built not so very long ago would now cost considerably nearer five thousand. Mr. Atterbury has succeeded, in spite of this, in designing a group of buildings each of which can be sold, with land complete, for considerably less than it would cost to build less carefully and skilfully arranged houses containing the same number of rooms and the same conveniences.

While it is not often that so excellent a building site is selected for development, it also remains true that not often has the architect and town-planner so carefully and successfully selected his materials and designs to harmonize with the site and with the local traditions of the surrounding country. This has been true even when conditions of site and surroundings have been equally favorable.

The main point of interest, then, in this particular development, lies in the fact that these houses could be reproduced in other parts of the country at figures only slightly varying from their cost at Indian Hill.

None of the houses are over-large or expensive. In the matter of size, the area of the buildings has been kept down to a minimum by a skilful use of every inch of space within the walls. There are no useless and unnecessary large halls or other wasted spaces, while, on the other hand, the planning is neither

(Continued on page 312)



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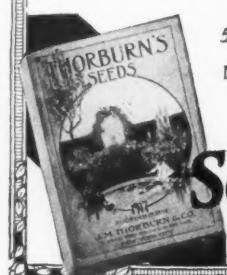
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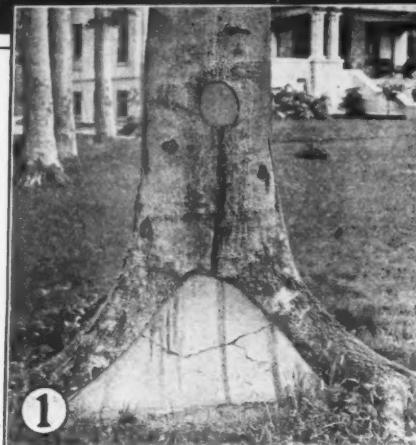
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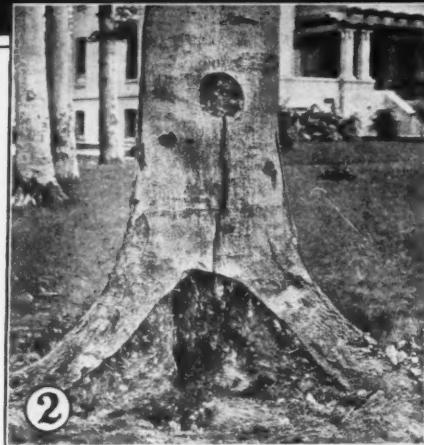


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The physician, the surgeon, or the dentist requires years of patient study, plus the intuitive skill born of ripe experience, before he is equipped to obtain successful results. This is also exactly true in Tree Surgery. However, in Tree Surgery, scientific accuracy is not enough. Think of the terrific windstorm with its bending and twisting! You will then realize that Tree Surgery must be mechanically perfect to withstand it. The mechanical principles and methods of bracing employed by a real Tree Surgeon would amaze you.

Trees cannot be "patched" like barn doors. Men without long training and experience cannot save them. Tree Surgery is a science unto itself—a science demanding highly specialized knowledge and remarkable skill for its successful application.

Facts little understood

Because the facts set forth above have not been understood, great injury has been done to thousands of trees everywhere and a vast amount of money has been wasted in disastrous tree "patching." It has been the fault of nobody in particular. Tree owners simply have not realized the degree of scientific knowledge and mechanical skill required in the permanent saving of trees. And "tree patchers"—the men who have been doing the faulty and dangerous work—are in many cases conscientious enough, but ignorant of the facts and lacking in skill.

Photograph No. 1 illustrates a typical case of tree "patching." To the untrained eye this work probably looks good, but a Davey Tree Surgeon saw at a glance that the conditions were bad. Growths of fungus disease appeared along the edges of the filling and on the bark between the large and small fillings.

Photograph No. 2 shows the filling taken out. Nearly every principle of the science of Tree Surgery had been violated—the rough decay *only* had been removed; the cavity had not been disinfected; the condition of decay behind this crude cement patch was actually appalling, and the filling had only been in two or three months; no bracing of any kind had been used; no means had been provided to exclude moisture; the large filling had been put in as a solid mass, making no allowance for the sway of the tree.

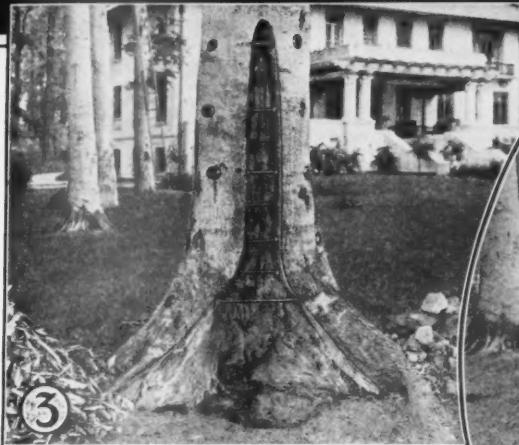
Photograph No. 3 shows all decay removed by a Davey Tree Surgeon; the cavity thoroughly disinfected and waterproofed; the mechanical bracing partly in place; the watersheds cut to exclude moisture.

Photograph No. 4 shows the Davey filling completed, put in sectionally to permit swaying without breaking the filling. This tree has since stood through many severe storms in perfect condition. New bark is now growing over the filling along the edges. The tree has been saved permanently!

Davey Tree

Every real Davey Tree Surgeon is in the employ of the Davey Tree Expert Company and the public is cautioned against those falsely representing themselves

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It is scientifically accurate and mechanically perfect.

Your trees, many of them the product of several generations, are priceless. Once lost, they cannot be restored in your lifetime or that of your children.

To whom shall you entrust them? There can be only one answer, for there is only one safe place to go—to Davey Tree Surgeons.

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Safe—because no Davey Tree Surgeon is allowed any responsibility until he has conclusively demonstrated his fitness. He must have served his full course of thorough, practical training and scientific study in the Davey Institute of Tree Surgery—a school, the only one of its kind in the world, which we conduct for the specific purpose of drilling our men according to Davey methods and Davey ideals.

Safe—because we who know values in Tree Surgery and who demand and deliver

the best, select the man to whom the treatment of your priceless trees is to be entrusted.

Safe—because Davey Tree Surgery has been endorsed as *best* by the United States Government after an exhaustive official investigation.

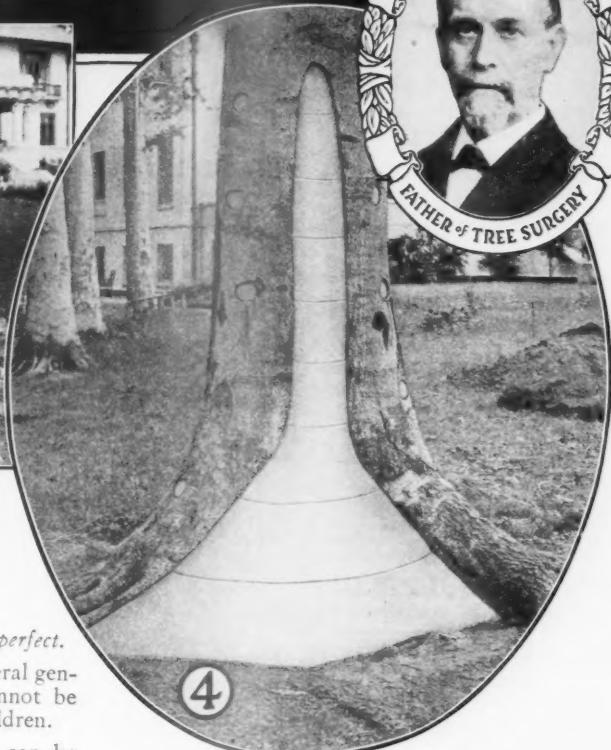
Safe—because Davey Tree Surgery is recommended by thousands of prominent men and women, whose endorsement you can accept with complete confidence. (Several such endorsements appear on the left.)

Safe—because Davey Tree Surgeons are *picked* men, thoroughly trained, conscientious, intelligent, courteous, in love with their work. "Men," writes Dr. H. D.

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SMALL SINGLE HOUSE

A cozy suburban home which is within the means of any thrifty fair salaried family man.

(Continued from page 308)
cramped nor is there noticeable a lack of closet room or other arrangements.

As to cost, the typical houses containing a living-room, dining-room, kitchen, three bedrooms, a bathroom and a porch, are sold for three thousand two hundred and eighty-five dollars, with the ground upon which they stand, and the double houses, containing an additional bedroom on the second floor sell for three thousand six hundred and thirty dollars.

Naturally these are figures that should cause some amount of thought. The houses could, perhaps, have been built even more cheaply, but the materials in that case would have been inferior, and as they have been built the buyer at Indian Hill, just as every purchaser or builder of a house should be, may have absolute confidence in the fact that the materials that have gone into his house are of the best. There is, perhaps, no material so well suited for the problem as the simple frame construction that was used.

It is a notable fact, too, that frame construction was decided upon by the architect only after careful consideration of all the practical and artistic points involved. Certainly nothing more picturesque could have been found to take the place of the white texture of clapboard walls as seen in a setting such as that at Indian Hill.

While this work, with Mr. Atterbury's other work of a similar nature, marks a high period of advance in more or less paternalistic industrial activities we are not so largely interested in that phase of the question as we are in the fact that the architect has shown us how well and compactly and economically a suburban house may be built.

In these houses we see not only examples of good design but examples of complete homes—and there is a difference in a "home" and a "house." Every detail, then, is worthy of mention. The structural framing of the houses is built of North Carolina pine, as is the interior trim. On the shingled houses cedar shingles were used.

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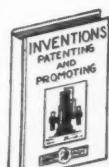
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The Big War is not wholly to blame for present conditions, nor the middlemen, speculators, etc. *Increased Population* and *Decreased Production* are the big causes, and normal times would have brought the same crisis which is now only harshly accentuated.

IT IS IMPERATIVE

that all land owners appreciate the true situation and that patriotic citizens enlist together for national agricultural co-operation to remove the causes and to further intelligent concerted action to advance the agricultural industry in the United States of America.



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CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY,
CANADIAN SOCIETY OF
FOREST ENGINEERS

The better protection of forests from fire is making rapid progress in Canada, and this country promises soon to out-distance its ally to the south. The Province of Manitoba has just passed a very complete act covering the whole subject of forest and prairie fires and putting into effect the permit system. The Canadian Forestry Association has been active and instrumental in the passage of this legislation and the Province is to be congratulated on coming into the ranks of those who wish to see rational and efficient protection and use of one of the most important of our natural resources. The time is coming when the people will not permit the destruction or wanton waste of property which should be conserved for our lifetime and for our children. When once it is realized that all forest and mineral wealth and also the fertility of agricultural soil is really the property of the nation and therefore of every voter, no office holders will be tolerated who do not administer such property for the common good.

The enforcement of the new Manitoba act will be carried out by Mr. Mulloy, who is proceeding to organize his fire wardens and rangers for the summer's work. He will coöperate with the Dominion Government fire rangers working on the reserves.

Mr. Robson Black, Secretary of the Canadian Forestry Association, is on a trip through the West in the interest of more general diffusion of knowledge about our forest resources and of better fire protection. He will call on all Government officials interested in such work and will lecture before Boards-of-Trade, Canadian Clubs and other public bodies.

The St. Maurice Forest Protective Association is trying to arrange for a test of an aeroplane for locating forest fires, and if this proves successful it hopes to introduce the aeroplane as a part of its mechanical equipment. There seems no reason to doubt that such a patrol would be much cheaper and more effective than the present ranger system, and if it should prove possible to land near a fire and extinguish it without calling for additional labor, the cost of fire protection would be very materially decreased.

A meeting was held recently in Montreal for the formation of a Montreal section of the Imperial Aero League and the question of the employment of these machines in commercial work of all kinds was discussed. Many aviators will be free after the war and they could be employed in carrying fast mail in forest fire protection and many other services.

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Westbury, Nassau Co., N. Y.

the Crown lands of the Province of New Brunswick has now progressed to an extent where many interesting and instructive conclusions may be drawn from the results already accomplished. To date the field parties have surveyed and examined 550,000 acres. Of this the mapping and compiling of 371,000 acres has been completed.

A letter received from one of the Staff Sergeants of the Canadian Forestry Corps says, "All the forestry battalions have been fused into a Corps, and in addition constant reinforcements are being drafted into it from the medically unfit of the infantry. The Corps is at present about five thousand strong, of whom 1500 are operating in France, and increasing every day. There are about twenty camps in England and Scotland. One Branch at Headquarters is called the Forestry Branch and this handles the technical forestry work and also all lumber returns. Captain Weir, a graduate of Ontario Agricultural College, McGill and Cornell, is in charge, and Sergeant Bricker, a student from Toronto Forest School, is his Assistant. Men in the field were given the title of Forestry Representatives and handled several camps each, sending in general forestry reports embracing silvical studies, soil studies, growth studies, etc., as well as reports on progress, accompanied by maps. Several Toronto men were on this work. Our rank was the high and lofty one of full private except Parker, who was a sergeant before this work was started. He has recently gone to France where he will be associated with the lumbering end of the work, I believe.

The mobilization of all the resources of the country for the better carrying on of the war has given added impetus to the forestry propaganda and the National Committee on Scientific Research will include forestry research work on its program.

work at the instigation of the British Forestry authorities. A party is to be sent out to visit all our camps making volume and increment tables. We are going to use the forms which were used at Toronto University for stem analysis and volume tables. This is going to be very valuable experience for us and our time spent as soldiers will not be wasted. Since the British authorities think that this is necessary, we can assume we are 'doing our bit.' There is a very serious shortage of timber, accentuated by the submarine blockade and all production work is being speeded up. The forestry exponents are using their influence to see that the government takes up the question of reforestation as soon as possible, some even advocating that this be commenced before the end of the war."

In Prince Edward County, Ontario, where the removal of the forest exposed a sandy soil, this has drifted and people picnicking in the woods at the edge of this desert amuse themselves by tobogganing down the sandy slopes.

A new idea in fire warning signs is being used in British Columbia and Quebec. Sign posts are put up on the trails and carrys giving the distances with the warning "Put Your Camp Fire Out."

The Canadian Society of Civil Engineers at a recent meeting put themselves on record as heartily in favor of proper forest protection and conservation.

The mobilization of all the resources of the country for the better carrying on of the war has given added impetus to the forestry propaganda and the National Committee on Scientific Research will include forestry research work on its program.

BOOK REVIEWS

An Uncensored Diary, by Ernesta Drinker Bullitt, 205 pp. Price, \$1.25. Doubleday, Page & Co., New York.

Perhaps one of the most interesting accounts of life and everyday conditions in the Central Empires during the present war period is that written by Ernesta Drinker Bullitt and incorporated in book form under the title of "An Uncensored Diary," from the press of Doubleday, Page & Company. Mrs. Bullitt is the wife of William C. Bullitt, and daughter of Dr. Henry S. Drinker, president of Lehigh University. When her husband, who is a newspaper man, was ordered to the battlefields of Europe by the Philadelphia *Ledger* last year, Mrs. Bullitt insisted upon accompanying him. Floating mines or submarines held no terror for her. She was dined by many of the greatest men and women in Germany, Belgium, Austria and Hungary, and without any thought of their future publication, recorded her experiences daily. The diary is particularly unique in that it portrays a condition of affairs as written within the borders of warring nations, and was passed by the censor of the Foreign Office in Berlin.

Mrs. Bullitt frequently was a guest of General von Bissing, governor of Belgium, and also of Baroness von Bissing in Berlin. The one supreme thought of the General and his wife, Mrs. Bullitt explains, is for the safety of their eldest son, who, taken prisoner by the French, was subjected to severe treatment because of alleged ill-treatment accorded the son of Delcassé by the Germans. Von Bissing, she writes, sympathizes greatly with the Belgians.

While in Berlin Mrs. Bullitt dined on numerous occasions with Ambassador Gerard, and when her husband visited the Foreign Office to interview the Under-Secretary of State, Zimmermann, she was along. The German statesman was genial and laughingly cordial to the American woman, explained Germany's ideals and plans, and Mrs. Bullitt treats the meeting with much interest in her book.

Describing the food condition in the various cities and towns visited, the author evokes much interest by her droll humor and alternating tragic treatment of the subject. Touching on the trials and pathetically helpless position of travellers while crossing the different frontiers, she draws a sombre picture not at all conducive to cheerfulness on the part of one who may contemplate a trip abroad. And the experiences and sensations of a young German lieutenant back to "civilization" from the trenches is worthy of note, for Mrs. Bullitt has projected into the character a semblance of humanness which appeals to the individual with "nerves." This young officer, accustomed to shrieking shells and bursting bombs, obnoxious gases and wet trenches, became very nervous if riding in

an automobile, and a tramcar crossing a street at the same time was too terrifying a thing to be borne. All through the book may be found meat for thought, while in various chapters wholesome humor and delightful comedy hold the attention.

Scott Burton, Forester, by Edward G. Cheyney. D. Appleton & Company, New York. \$1.35.

A combination of a forestry education with fighting forest fires, chasing poachers, trapping bears, canoeing and all the ups and downs of college life in a big University, makes Scott Burton, Forester, mighty good reading, especially for a young fellow with a college life before him and a love of the outdoors. Scott, a tenderfoot from the East, goes West to the Forest School of the University of Minnesota to prepare for his chosen life work. He soon learns that there is a tremendous difference between the training he received in the East for his profession and that which the western boy gets, and works hard to overcome his handicap. He does well in his work and achieves great popularity among his fellows which almost turns his head. His solution of that situation is interesting. The book contains a wealth of authentic forestry information, in addition to being a mighty readable story, which gives it a double value.

The Bird Study Book, by T. Gilbert Pearson. Doubleday, Page & Co., New York. Price, \$1.25.

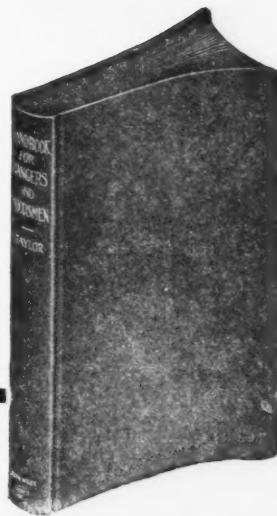
Mr. Pearson, as secretary of the National Association of Audubon Societies, is nationally known as an authority on birds. In this book he aims to present information for the consideration of that steadily growing number of Americans who wish to acquire greater familiarity with the habits and activities of wild birds. The book is intended for the beginner in bird studies. It is plentifully illustrated and will be found of great value to those desiring a knowledge of bird life in this country.

Forest Working Plans, second edition, by A. B. Recknagel. John Wiley & Sons, New York. Price, \$2.00.

The welcome accorded the first edition and the steady demand for it has encouraged the author to compile a revised and enlarged second edition. The book presents that which is best in European forest organization which is adaptable to the present methods of American forestry. The book is of particular value not only to the student but also to the practical forester.

Essentials of American Timber Law, by J. P. Kinney. John Wiley & Sons, New York. Price, \$3.00.

The book is devoted to a presentation of the existing law governing trees and their products as property, with such observations and references to historical development as are considered necessary to an understanding of the reasons for existing law.



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CURRENT LITERATURE**MONTHLY LIST FOR APRIL, 1917**

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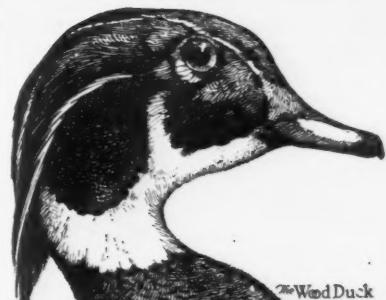
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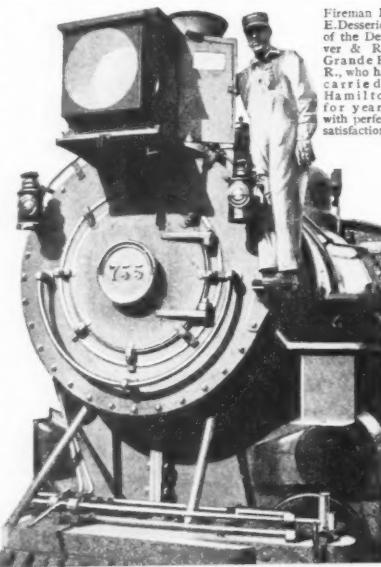
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